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Collection of Submissions on Innovative Financial Mechanisms

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COP 10 / MOP 5

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Canada

Canadian Submission in response to CBD notification 2011-069

Innovative Financing

CBD Decision X/3, A, paragraph 8(c), "Invites Parties, relevant organizations and initiatives… to submit information concerning innovative financial mechanisms that have potential to generate new and additional financial resources as well as possible problems that could undermine achievement of the Convention's three objectives".

Within this context, Canada would like to share a small sample of biodiversity-related innovative financing experiences that have been generated domestically.

1. Canada's Environmental Damages Fund:

The Environmental Damages Fund (EDF) follows the Polluter Pays Principle to help ensure that those who cause environmental damage or harm to wildlife take responsibility for their actions. The EDF is a specified purpose account created in 1995, administered by Environment Canada, to provide a mechanism for directing funds received as a result of fines, court orders, and voluntary payments to priority projects that will benefit our natural environment. The majority of funds are directed to the EDF through statutory fines and court-ordered payments. Since 1995, the EDF has received over $4.5 million from 154 awards and has funded 149 projects across Canada. Priority funding is given to projects that restore the natural environment and conserve wildlife in the geographic region where the original incident occurred. To be eligible, projects must be delivered in a cost-effective, technically feasible and scientifically sound manner, and must address one or more of the following EDF categories: Restoration (highest funding priority); Environmental Quality Improvement; Research and Development; Education and Awareness.

2. Canada's Ecological Gifts Program:

Canada's Ecological Gifts Program provides a way for Canadians with ecologically sensitive land to protect nature and leave a legacy for future generations. Made possible by the terms of the Income Tax Act of Canada and the Taxation Act in Quebec, it offers significant tax benefits to landowners who donate land or a partial interest in land to a qualified recipient. Recipients ensure that the land's biodiversity and environmental heritage are conserved in perpetuity.

The Ecological Gifts Program is administered by Environment Canada in cooperation with dozens of partners, including other federal departments, provincial and municipal governments, and environmental non-government organizations. As of March 31st, 2011, 892 ecological gifts valued at nearly $569 million have been donated across Canada, protecting over 140,000 hectares (1 400 km^2) of wildlife habitat. More than one-third of these ecological gifts contain areas designated as being of national or provincial significance, and many are home to some of Canada's species at risk.

3. Ontario's Managed Forest Tax Incentive Program:

The Province of Ontario's Managed Forest Tax Incentive Program (MFTIP) is a voluntary program administered by the Ministry of Natural Resources to provide lower property taxes to participating landowners who agree to conserve and actively manage their forests. Under MFTIP, participating landowners have their property reassessed and classified as Managed Forest and are taxed at 25 percent of the municipal tax rate set for residential properties. By 2004 the MFTIP had grown to include over 10,000 properties in the Province of Ontario with over 700,000 ha (1.78 million acres).

4. The Nova Scotia Habitat Conservation Fund:

The Nova Scotia Habitat Conservation Fund was established under the Nova Scotia Wildlife Act to assist the funding of programs for the protection and enhancement of wildlife habitats. The $3.09 Wildlife Habitat Stamp / License is the primary funding mechanism for the fund. The Fund is organized under four objectives: Enhancement, Acquisition, Research, and Education. Each objective has a set of Priority Activities. The Habitat Conservation Fund will partner in projects on a cost shared basis not to exceed 75% of total project cost. In 2010 a total of 15 projects were funded for a total investment of $205,325.

5. British Columbia's Habitat Conservation Trust Foundation:

The Habitat Conservation Trust Foundation (HCTF) is a not for profit charitable foundation established in 2007. The primary purpose of the Foundation is to act as Trustee of the Habitat Conservation Trust, which was created in 2007 by an amendment to the Wildlife Act. Hunters, anglers, trappers and guide-outfitters contribute to the Foundation's enhancement and education projects through licence surcharges. Voluntary contributions, proceeds from the sale of education materials, and court awards provide additional revenue.

The HCTF is a proposal-driven organization, and it invites proposals from anyone who has a good idea that seeks to benefit fish, wildlife and habitat in British Columbia. All proposals are scrutinized by teams of technical experts, and the very best proposals receive funding. Since the inception of its work in 1981, the Foundation and its predecessors have invested over $120 million in over 2000 projects across British Columbia.

6. Ontario Provincial Parks User Fees:

The Province of Ontario contains almost 8 million hectares in 329 provincial parks. In 2010 it received over 9.5 million visitors. These visitors pay user fees for a variety of services, including camping and use of recreation areas (beaches, trails, etc.). In Fiscal Year 2009 – 2010, CDN$ 65.3 million was generated in revenue through Ontario's Provincial Parks user fees. These user fees, along with other park revenues, are deposited in an account dedicated solely for the use of Ontario Parks.

7. Darkwoods Forest Carbon Pilot Project

The Darkwoods Forest Carbon pilot project is the largest forest carbon project to date in North America. It harnesses the power of the carbon market to further large-scale conservation in British Columbia. By purchasing the forests of Darkwoods, a 136,000 acre (55,000 hectare) project area in south-eastern BC, for conservation, the Nature Conservancy of Canada (NCC) eliminated the threat of these forests being eliminated through logging. The forests of Darkwoods are also carbon sinks, storing an enormous amount of carbon. To help fund this conservation project, NCC engaged a group of carbon experts to create an innovative carbon project that, through the sale of carbon credits, will generate funding to support and sustain the cost of long-term conservation. The first sale of Darkwoods carbon credits was completed in May 2011, raising in excess of $4 million for conservation. This initial transaction involved the sale of 700,000 tonnes of carbon offsets.

A key component of the Darkwoods Forest Carbon Project is to ensure it remains authentically conservation-based at every step, meaning that the credits will only be sold to organizations that are committed to going beyond compliance standards to achieve additional reductions in their carbon footprints. This project also opens the door for other landowners and conservation groups to consider the use of carbon credits (and this approach) as a means of helping finance the conservation of natural areas that are also longstanding carbon sinks.

European Union

EU submission of information concerning innovative financial mechanisms, pursuant to decision X/3, A, paragraph 8(c)

29 June 2011

1. Introduction

In CBD Decision COPX/3, §8(c), COP invited Parties, relevant organizations and initiatives, such as the World People's Conference on Climate Change and the Right of Mother Earth, to submit information to the Executive Secretary concerning innovative financial mechanisms that have potential to generate new and additional financial resources as well as possible problems that could undermine achievement of the Convention's three objectives.

Given that the resources do not meet the level required to enable the full and effective implementation of the objectives of the CBD, and the estimated extent of the present financing gap, it is crucial to explore the potential of innovative financial mechanisms (IFMs) to complement existing commitments with a view to increasing funding to support the three objectives of the Convention on Biological Diversity. IFMs provide opportunities for both the donors/investors and the receivers. An ample and diverse range of innovative mechanisms is already being used in a number of countries. Based on practical examples from all over the world, there is clear evidence that such IFMs can significantly support the financing of actions to reach CBD objectives at local, national and international levels.

Innovative financing mechanisms are likely to play a far more prominent role in international financing for development in the near future. In December 2010 the UN Resolution A/RES/65/146 was adopted, which stressed that innovative mechanisms of financing can make a positive contribution in assisting developing countries to mobilize additional resources for development on a stable, predictable and voluntary basis. A more in depth analysis and debate will take place during the 66th General Assembly is in preparation. Furthermore, the World Bank, the OECD Development Assistance Committee (DAC) and other international organizations are giving more importance to IFM as a means of mobilizing additional resources both from private and public origin, involving new partners in the financing for the development agenda, and enhancing the use and efficiency of financial flows and making them more result-oriented and effective.

The effective implementation of the CBD Strategic Plan 2011-2020 will require an adequately increased mobilisation of resources from all possible public sources, as well as increased resources from private sources including innovative financial mechanisms. Therefore, the EU and its MS consider it necessary that COP 11 gives political support to one or more IFMs, identifies basic principles to judge their relevance and function, and lays out a plan for their further development.

In order to promote the realization of the potential of innovative financial mechanisms, it is important to analyse the pro's and contra's of existing and potential innovative mechanisms. However, analysis cannot remain a paper exercise, careful field testing of IFM must be encouraged, in well monitored and reviewed pilot phases. This can help develop principles and safeguards to ensure that these mechanisms fully contribute to the achievement of the CBD objectives. The European Union and its Member States therefore welcome the opportunity to look into this issue in more detail.

2. Guiding principles

The potential of innovative financial mechanisms depends on multiple factors such as their design, the institutional framework, the geographical scale, involvement of stakeholders, etc. It is therefore important to evaluate possible IFMs against some basic principles.

The EU and its Member States consider the following principles as essential when evaluating the opportunities and challenges related to the 6 categories of IFMs identified in the Strategy for Resource Mobilisation (COPIX/9, Annex, Goal 4).

- **Contribution to CBD objectives and environmental integrity**

Regardless the nature or the type of the IFM the use and delivery of additional resources, it should be in line with the CBD and contribute to its objectives, namely the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. It should neither directly nor indirectly affect biodiversity negatively. Prior to the implementation of any kind of IMF, a thorough environmental impact assessment needs to be carried out in order to evaluate and gauge the impact on biodiversity but also on the larger environment.

Safeguards, both environmental and socio-economic, may need to be established when designing and implementing IFMs. Biodiversity criteria, targets or guidelines, in particular, should be reflected in the objectives of any IFM.

IFMs will be more effective when they also influence the direct drivers and pressures (e.g. land use change, climate change) and address the root causes of biodiversity loss.

- **Generating funding**

Innovative financial mechanisms have significant potential to generate new and additional financial resources at local, national and international levels. International innovative financing mechanisms can provide financing for sustainable development, especially towards the poorest and most vulnerable countries. However, the scale and predictability of financing that can be generated varies across IFM, and this could be an important criterion when prioritising which instrument to use.

Economic leakages should be carefully considered, so that the additional constraints/incentives provided by new policy schemes do not lead to additional pressure elsewhere, where such policies have not been implemented. IFMs should aim at as low as possible administration costs. During the design of the IFM the economic efficiency of the generation and redistribution of funding needs to be ensured.

- **Social integrity of IFMs**

In the same way that IFMs should have positive impacts on biodiversity conservation and sustainable use, safeguards should be in place to ensure that the generation of resources does not cause adverse social impacts. An important aspect is the tenure and user rights of local peoples as recognized in Decision CP 16 on REDD safeguards provides a useful example calling for the 'respect for the knowledge and rights of indigenous peoples and members of local communities, by taking into account relevant international obligations, national circumstances and laws, and noting that the United Nations General Assembly has adopted the United Nations Declaration on the Rights of Indigenous Peoples'.

- **Governance aspects**

The efficient application of any IFM will depend on supporting the capacity and governance structure needed to make it work. This entails also the involvement of local communities as

well as the private sector.

To facilitate ownership and ensure support to the implementation of the biodiversity commitments, it will be important to determine financing needs and identify possible IFMs during the review of the NBSAPs. Furthermore, transparency and accountability are crucial elements when implementing any IFMs.

3. Examples of promising instruments

In the annex different examples of promising instruments can be found. These instruments generate public as well as private biodiversity funds at local, national and international levels.

Payment for ecosystem services can also provide funding needed for maintaining and enhancing ecosystems and their services at all levels. The examples in Annex show that PES can take many forms. Funding can stem from the private sector, but also from the public sector. Payments can be in kind as well as monetary, voluntary or compulsory. Depending on the design of the schemes, emphasis can be put more on the environmental benefits, or on the income re-distributional aspects, using social criteria.

In this context it will be important to consider efforts under the Nagoya Protocol on Access and Benefit Sharing. The potential role of access and benefit-sharing to contribute to the conservation and sustainable use of biological diversity, poverty eradication and environmental sustainability is recognized in the Protocol and Parties to the Protocol shall encourage users and providers to direct benefits arising from the utilization of genetic resources towards the conservation of biological diversity and the sustainable use of its components.

Biodiversity offsets of operations and activities provide good possibilities at local and regional levels. There is a large scope for offsetting biodiversity impacts of investment projects as well as impacts along the value chain. In any case, proper safeguards must be in place in order to ensure that the offsetting is done at the appropriate scale and safeguards are needed for the mitigation hierarchy to ensure that the use of offsets does not replace prevention and mitigation of threats to biodiversity are exploited. A number of international, voluntary standards are already available (such as the Ecuator Principles), and their use by financial institutions should be enhanced. In the EU, biodiversity offsets are taking place with demonstrated benefits (see examples from France and Germany in Annex).

Biodiversity co-benefits of climate change funding also has good potential. This applies to the protection of forests, but also to other ecosystems with high adaptation and mitigation climate benefits, e.g. wetlands and grasslands. Again safeguards may also be needed as currently discussed in the context of REDD schemes.

Fiscal reform can also on the one hand, adjust market signals to ensuring the values of biodiversity are adequately reflected and provide incentives for the conservation of biodiversity, and on the other hand generate or transfer revenues to economic actors. The example given in the Annex shows how fiscal transfers are used in the Netherlands to provide incentives to green projects, including biodiversity-related ones.
Finally, green products, for example the use of certification, can also generate additional funding for biodiversity, both at national and international level, as described in the Annex.

4. Conclusions

It will be important to evaluate each IFM on a case by case basis against established

principles to maximise the benefit for the implementation of the CBD while avoiding any possible negative impacts (environmental and social).

Based on these principles, some of these instruments reviewed are particularly promising, although some safeguards will also be needed in certain circumstances to ensure they deliver on the objectives of the CBD. Innovative financial instruments have the potential to raise additional funding, both at international level (e.g. REDD+ schemes, ABS), and at national and local level (e.g. payments for ecosystem services, biodiversity offsets), from private or public sources. As well as generating new financing, some mechanisms such as payments for ecosystem services can also be an efficient delivery mechanism for public funding, whether local, national or international. Some of the examples in Annex given clearly show that IFM are complements rather than substitutes to traditional donor funding, and in some cases are also an efficient way of delivering ODA funding.

The EU and its Member States look forward to the CBD Secretariat compiling the information contained in the submissions from Parties. This will be useful input in the discussions leading up to COP-11, to explore how innovative financial mechanisms can augment and complement traditional financing sources, and increase effectiveness of delivery, while respecting the key principles outlined above.

Annex

Examples for Innovative Financial Mechanisms

1. Payment for Ecosystem Services (PES)

The French Vittel Company's case: a voluntary and bilateral PES, involving private finance

Maybe one of the oldest cases quoted by the literature, the case of Vittel is somehow symbolic of the PES concept. At the end of 1980s, Vittel (a French company selling natural mineral water) noticed threats on water nitrates and pesticides rates while it had to remain exempt from any treatment to keep its natural mineral water qualification. The private company then launched an agricultural improvement program on the 5000 ha catchments area of the springs exploited. The objective was to reach a 10 mg / l rate of nitrates (against about 40 mg / l at this time), and 0 pesticides in the water. Within this program framework, Vittel bought the majority of farmlands and exploitation rights of lands located where mineral water is collected. Vittel then gave these lands, free of charge, to interested farmers at some good practice conditions. These condition where elaborated by the French agronomic research institute (INRA).
Beyond this, Vittel pays 228 Euros per ha and per year to each farmer for a 7-years period, via AGRIVAIR, an intermediary specially created for this. AGRIVAIR also supplies free services to farmers (technical advice on excrement composting for example). The length of farmers' commitment is of 18 or 30 years. The program has cost Vittel the equivalent of 0, 15 centime of Euro by litre, for an expense of about 15 M€. (Perrot-Maître, 2006; INRA, 1997)
Vittel is often described as an example of a cost-effective solution. It is interesting to note that it is a private and almost bilateral initiative, with direct contract-based links between the company, which buys a practice corresponding to its interests, and the farmer, who "sells" this practice.

Synergies between Climate and Biodiversity Financing

With the International Climate Initiative (ICI) the German Federal Ministry for Environment established in 2008 an innovative instrument for financing international climate protection projects including biodiversity projects. More than one third of the funds are supporting projects for the conservation of biodiversity with relevance for climate change mitigation and adaptation (e.g. protection of forests, restoration of peat lands and mangroves, protected areas, REDD, ecosystem based adaptation). The ICI is using an innovative source of funding by using part of the revenues generated from auctioning emission trading allowances (within the European Emissions Trading System ETS). In the first three years the ICI was able to fund international climate projects with over 450 Mio. Euro from which approx. 180 Mio. Euro went to biodiversity relevant projects. This new form of environmental cooperation complements the German Government's existing development cooperation.

In addition, to the example above, the EU and its Member States have learned with interest of the following examples outside the EU:

Los Negros in Bolivia: a voluntary and collective PES combining local and international payments

This scheme relies on a PES mechanism to protect the threatened watershed forest of Los Negros in Bolivia. Two different 'byers' focus on two different environmental services:

- "US fish and wildlife service", an American agency, pays for forest protection and its housing of rare species of migratory birds.

- Pampagrande, the city located downstream, contributes to the mechanism from its general budget, so that the farmers of its territory benefits from continuous flow of water in dry season, and can thus irrigate 1000 hectares of farmlands.

All property owners situated upstream to the watershed were invited to take part in the program. ES providers kept the choice of the land they wished to register and of their contract duration. Contracts forbid trees cutting, hunting and clearing forests practices. The main originality of this program is the implementation of an in kind payment aiming at maintaining sustainable practices. During the negotiation phase, it was decided to finance a bee hive during one year for 10 ha of protected forest, amounting $3 / ha / year. This payment also comes along with training in beekeeping.

Mexico City State forests hydrological services: a compulsory and bilateral PES stemming from use rights payments or ES affected taxes

In the State of Mexico City, the government set up its own system of hydrological PES, whose objective is to protect surfaces of forests. The purpose is in particular to guarantee the availability of water for inhabitant's consumption in Mexico City. Rules of implementation are published (conditions, commitments, selection procedure, etc.). According to this program, landowners receive 1500 pesos / ha / year (91 Euros) to protect their forest. To guarantee the financing of the operation, the government of the State of Mexico set up a tax on state water distribution companies, which have to give 3.5 % of their turnover to contribute to the PSE program. A similar scheme is currently under development at the national level, using money both from affected taxes (on water distribution companies) and from the general Mexican Budget

Environment as a resource for Costa Rica's economic development: a compulsory and collective PES stemming from general public budgets

The Costa Rican national law on forest mentions four environmental services, supplied by forest ecosystems, which must be exploited in a sustainable way: Climate change mitigation, biodiversity conservation, the protection of watersheds, and the conservation of the landscapes. Since 1997, the "Pagos por Servicios Ambientales" program pays compensatory payments to more than 4400 farmers and forest owners to improve afforestation, sustainable management and forests protection. This PES takes the form of multi-annual contracts (often over 20 years): new plantations, development of related activities, slaughter of wood made in a long-lasting way, etc. A specific financial institution was created to support this mechanism: the Forest National Fund (FINAFO for Fondo Nacional de Financiamiento Forestal). Its sources of funding result from a tax on the sale of fossil fuels, from receipts resulting from hydroelectric companies, from loans of the World Bank and from grants of the Global environment facility. This case was strongly mediatized by the World Bank as being the example of an innovative and successful policy of management of the biodiversity.

Finally, the EU is funding a number of projects that implement innovative financing mechanisms in developing countries, including the following example:

PES to promote forest conservation of the Columbian Amazon

The EU is funding a number of projects that finance schemes implementing innovative financing mechanisms in developing countries. For example, the European Union is supporting a new project in Columbia, 'Environmental Governance to Prevent Deforestation and Promote Forest Conservation of the Colombian Amazon', with the aim of contributing to the sustainable financing of protected areas, and the benefits they provide to people, through payments for ecosystem services. The project will help ensure the conservation of the Amazon and the well-being of its peoples, through strengthening indigenous authorities' role in the creation and governance of adequate mechanisms to ensure a fair system of payments for their contribution to the maintenance of key ecosystem services.

2. Biodiversity offsets

The Business and Biodiversity Offset Programme (BBOP)

According to the BBOP Programme biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse impacts on biodiversity arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity.

Mitigation hierarchy in France

Under EU and French legislations, plans, programmes and projects with potential adverse impacts on the environment (including biodiversity) have to include mitigation measures in order to avoid, reduce, and, if possible, remedy their significant adverse effects on the environment (Environmental Impact Assessment and Strategic Environmental Assessment Legislations).
Biodiversity-orientated regulations require to apply the mitigation hierarchy with more specific requirements on biodiversity. For instance, the French Forest Code provides specific rules for forest clearing: the administrative authority may order the developer to plant or replant an area 1 to 5 times the size of the cleared surface, depending on its ecological and social importance. Specific rules also apply to Natura 2000 sites and to the exemption from the prohibition to the destruction of protected fauna and flora species. For the implementation of these regulations, offset measures are strictly defined, when needed, to maintain or to restore the conservation status of the sites, of the natural habitats or of the species concerned.

The mitigation hierarchy's has, as a main purpose, to ensure no net loss and preferably a net gain of biodiversity.
An explicit legal framework is a key condition to an efficient implementation of the mitigation hierarchy. France has begun enacting regulations in that field from 1976 and has broadened and strengthened it throughout the years. Most recently – in date of July 2010 - the mitigation hierarchy was extended to impacts on ecological continuity. Moreover, developers were made legally responsible for monitoring, evaluating and reporting on the mitigation and offset measures implementation and impacts. At last, the law enforcement process was also strengthened so as to ensure its proper application.
Governance is another key component. In practice, mitigation and offset measures are designed by the project developer and reviewed by multiple independent environmental authorities. Some of these authorities gather scientists and environmental NGOs. They check, on a case by case basis, that all feasible measures were adopted in order to avoid and/or mitigate impacts, to ensure that offset measures remain a last resort solution. They also verify that the offered offsets were well designed.

France is currently testing offset banking mechanisms with a view to improving the quality and sustainability of offset measures implemented.

Finally, they ensure that potential adverse socio-economic impacts (e.g. on agricultural activities) have been minimized or mitigated. The analysis and recommendations from these authorities are then made public, and serve as a ground to the following official decision.

German Eingriffsregelung (impact mitigation regulation)

In Germany, the Federal Nature Conservation Act (BNatSchG) establishes the general framework for the Eingriffsregelung, while implementation is regulated through the nature conservation law of the federal states. According to Article 19 BNatSchG, impacts on nature and landscape have to be avoided. These are defined as *"changes to the shape and appearance or utilisation of land or changes to the groundwater table with its close correlations to inhabited soil compartments, that may significantly impair the ecosystem, or the national scenery"*. The BNatSchG indicates the broad field of application of the Eingriffsregelung, which not only includes selected natural resources (e.g. particularly valuable

animal and plant species or conservation areas), but the entire ecosystem and its capacity and natural scenery (Article 18 BNatSchGNeuregG). This should broadly ensure the status quo of nature and landscape in perpetuity.

However, in the case of unavoidable impacts, the project developer has to implement appropriate measures of nature conservation and landscape management to compensate. The Eingriffsregelung quires the application of a mitigation hierarchy, following different steps for the evaluation of impacts and the elaboration of counterbalancing measures, resembling a cascade (see figure 5). These range from avoidance to mitigation and compensation and possibly a compensation payment. Thus, the Eingriffsregelung covers two focal points, one being the obligation to conserve the status quo via avoidance (preventive approach), and the other being compensation for unavoidable impacts (corrective approach).

As laid down in Article 18 of the Federal Conservation Act, the application of the Eingriffsregelung begins with the identification and evaluation (in terms of significance) of the impacts of a project, plan or action on nature and the landscape. Due to the very broad meaning and scope of "ecosystem and landscape scenery" and a comprehensive spatial approach, most action that are subject to authorisation are obliged to carry out an assessment based on that shown in Figure 5, regardless of the size of the action and whether a particularly valuable area is affected or not.

According to Article 19 (1) of the Federal Conservation Act the "intervening party shall be obligated to refrain from any avoidable impairment of nature and landscape".

The avoidance requirement protects not only the current state of the environment, but also takes into consideration future developments, as far as their occurrence can be predicted. In this respect, the Eingriffsregelung also secures nature and the landscape for the future.

As noted above, unavoidable impairment has to be compensated through nature conservation and landscape management measures. The extent of the compensation measures under law is determined by the principle of full compensation. This principle stipulates that significant or lasting impairment caused by an impact on nature and/or the landscape has to be compensated entirely by appropriate measures and, in the case of remaining adverse impacts, by a compensation payment.

3. Fiscal transfers

Green Funds Scheme

The Green Funds Scheme in the Netherlands is an example of fiscal transfer, in which green projects are stimulated by tax exemption for investors (private and institutional). Green projects with lower interest rates can thus be funded; investor's returns are normal through the fiscal compensation. Green projects need recognition from government that can thus assess the environmental gains. Banks are the executing body and lenders. The scheme in its existence has raised more than 7 billion euro for 5000 green projects (1995 – 2007).
Examples of green projects are nature- and landscape conservation, sustainable aquaculture, sustainable energy generation and spatial restructuring of business parks.

4. Markets for green products

Round Table on Responsible Soy Association

The Round Table on Responsible Soy Association (RTRS) is one of an increasing number of commodity-based initiatives promoting responsibility and sustainability and in so doing enabling new markets for green products. Established in 2006 as a Swiss not-for-profit association and managed by an Executive Secretariat based in Buenos Aires, RTRS "promotes the use and growth of responsible production of soy, through the commitment of the main stakeholders of the soy value chain and through a global standard for responsible production."

The standard aims for no conversion of High Conservation Value Areas for soy cultivation and also for

maintaining on-farm biodiversity. Regarding labour relations, the standard does not allow for child labour, forced labour, discrimination or harassment. Regarding community relations, the standard requires that in areas with traditional land users, conflicting land uses need to be avoided or resolved, and that local people have a fair opportunity for employment and for providing goods and services.

Green Development Initiative (GDI)

The GDI aims to significantly increase financial resources for biodiversity conservation and sustainable use by stimulation of voluntary private funding of sustainable land management practices. The GDI proposes to set up a certification scheme to certify land management plans and practices that deliver measurable, tangible biodiversity and social development outcomes above a business as usual scenario. The revenues will compensate or reward land users for their activities leading to sustainable use or conservation of biodiversity. The GDI is not proposing to sell land or land rights.

Currently, GDI-pilots are being designed, e.g. with development NGO Solidaridad in production areas of different commodities and with WWF in other economic sectors. By identifying and implementing pilot projects the GDI process creates an effective 'learning by doing' environment. Pilot projects are planned to provide insights in relevant issues, solutions and approaches to these issues, as well to demonstrate the potential in terms of effectively showing biodiversity and development outcomes. Furthermore they need to show the business case by attracting willing buyers. The aim is to start elaboration of selected management plans by October 2011. Progress will be reported at Rio+ 20 and CBD CoP11 in 2012.

5. Business-biodiversity partnerships

The Wetland Carbon Partnership

In 2008, the Danone Group, the International Union for Conservation of Nature (IUCN), and the Secretariat of the Ramsar Convention on Wetlands established a three-year partnership "to provide a means for Groupe Danone to offset the carbon emissions of some of its brands, primarily Evian, by preserving and restoring wetlands [and to] enable the Ramsar Convention to promote the environmental contribution made by wetlands in the fight against climate change, whilst allowing the IUCN to help preserve and increase biodiversity."

The Wetland Carbon Partnership published a standard and guidance for developing wetland carbon projects which have positive impacts on climate change, biodiversity and communities. As well, the Partnership drafted a new methodology for carbon offsets through restoration of mangrove ecosystems and identified a pipeline of potential mangrove restoration pilot projects. The new methodology has been submitted to the UNFCCC for use under its Clean Development Mechanism.
Building on these efforts, Danone has invested in two pilot projects in Senegal and India and is exploring opportunities for new wetland carbon investments in Indonesia, Mexico and elsewhere. A key element of the pilot projects is that they "benefit local populations, who will be offered the opportunity to become involved with conservation, sustainable management and ecosystem rebuilding operations."

6. New forms of charity

Save Our Species Initiative

Launched at CBD COP10 in October 2010, the Save Our Species (SOS) Initiative is a partnership between the Global Environment Facility (GEF), the International Union for Conservation of Nature (IUCN) and the World Bank "to build the biggest species conservation fund, supporting on-the-ground field conservation projects all over the world. …SOS-funded projects will focus on conservation of threatened species and their habitats."
The unique feature of SOS is its focus on species: "Focusing on threatened species is a successfully-proven approach in nature conservation. Species are the visible building blocks of biodiversity and are

the most useful and recognizable indicators of ecosystem health. They have been widely studied and identified, are measurable and are covered by environmental legislation and conventions." SOS is providing two types of grants: (a) species conservation grants ranging from $25,000 to $800,000 in response to project proposals, and (b) rapid action grants to support conservation actions in emergency situations.

Importantly, SOS-funded projects are subject to the conditions of the SOS Environmental and Social Management Framework (ESMF) which is based on IUCN and World Bank safeguard policies and addresses such issues as environmental assessment, natural habitats, indigenous peoples and involuntary resettlements. For example, SOS will not support projects that involve the significant conversion or degradation of critical natural habitats, the use of pesticides or agrochemicals; land acquisition or relocation of local communities; or affect indigenous peoples without having obtained their consent.

7. Others

The CBD LifeWeb Initiative – A clearing-house for protected areas financing

The CBD LifeWeb Initiative was launched during the 9th Conference of the Parties to the CBD in 2008 in Bonn, Germany. LifeWeb is not an Innovative Financing Mechanism as such as it is not generating funding itself. However, LifeWeb is an innovative mechanism to enhance coordination and cooperation regarding protected areas financing. CBD LifeWeb assists development cooperation partners by: 1) helping recipient countries to convey their financing priorities to multiple donor partners through an internet-based clearing-house and through the realization of financing roundtables 2) helping (public and private) donors to gain information about recipient countries' financial priorities and coordinate counterpart funding opportunities with others. Since the beginning of the initiative LifeWeb has been able to facilitate more than 200 Mio. USD funding. For more information: http://www.cbd.int/lifeweb/

India

India's submission on Innovative Financial Mechanisms

- First and foremost, any discussion on innovative financial mechanisms (IFM) must be premised on the condition that these should be designed to supplement, and not substitute the new and additional financial resources committed by the developed country Parties under Article 20 of the CBD. This as yet unfulfilled commitment continues to be the main obstacle that is impeding the effective implementation of the CBD.

- Notwithstanding the above concern, there is indeed merit in discussing IFM because of their potential in complementing the existing commitments so as to increase funding in support of the three objectives of the CBD, considering that the effective implementation of the Aichi targets under the Strategic Plan on Biodiversity for 2011-2020 would require enhanced mobilisation of resources.

- There have been a few examples of IFM being practised in different parts of the world. These 10-15 IFM instruments are also being discussed in various international fora including CBD and GEF. However, many of these concepts (e.g. Business and Biodiversity offsets Programme, Green Development Mechanism etc.) are not adequately fleshed out, and therefore lack clarity and details.

- India too has been experimenting with some tools of IFM such as positive incentives for forest conservation, Protected Areas etc. However, considering the vast diversity in national circumstances at the ground level, discussions in IFM in multilateral fora can only be in the form of some guidelines, possible options, and safeguards, with each country having the flexibility of considering one or more of such tools in accordance with their national circumstances.

- While considering any IFM, care needs to be taken that the benefits spread across various stakeholders, and requisite enabling frameworks are put in place to effectively implement such processes.

- At the national level, leveraging of resources by mainstreaming biodiversity into sectoral and cross-sectoral strategies, plans and programmes can be an effective tool of IFM. This can be done by integrating biodiversity concerns into the programme of relevant sectors such as agriculture, forestry, fisheries, tourism, industry etc.; into national development plans including for implementation of MDGs. and poverty reduction strategies; and into the planning processes at all levels of Government (i.e., national, State/provincial and municipal). Considering that pursuant to the decision X/2 of CoP-10, Parties have to review and revise as appropriate their NBSAPs, this is a timely opportunity for mainstreaming biodiversity into the national planning and development processes.

- At the international level, REDD plus mechanism has the potential to deliver co-benefits for biodiversity conservation as well as for poverty alleviation, thereby simultaneously addressing climate change, rural poverty, biodiversity conservation and sustaining ecosystem services.

- In this background, India has launched Green India Mission with a budget of 10 billion USD over 10 year period, under its National Action Plan on Climate Change. The objectives inter alia include to improve biodiversity, ecosystem services, hydrological services and carbon sequestration in 10 m ha and increase forest-based livelihood income for 3 m forest dependent households.

- At the international level, early entry into force and effective implementation of the Nagoya Protocol on Access and Benefit Sharing holds promise as an IFM to contribute to the CBD's first two objectives on conservation and sustainable use of biodiversity, as well as to poverty eradication and sustainable development. This would be possible because benefits accruing from utilisation of genetic resources would act as incentive to biodiversity-rich countries and their local communities to conserve and sustainably use their biodiversity. Further, by promoting the use of genetic resources and associated traditional knowledge, and by strengthening the opportunities for fair and equitable sharing of benefits from their use, the Protocol would create incentives to conserve biodiversity, sustainably use its components, and further enhance the contributions of biodiversity to sustainable development and human well-being.

- An important issue that needs to be addressed through IFM is that not undertaking developmental activities in biodiversity rich areas with the aim of protecting biodiversity would entail substantial opportunity costs. It is crucial to evaluate and meet these opportunity costs.

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Japan

Submission of information concerning
Innovative Financial Mechanisms from JAPAN

Introduction

With reference to the Notification SCBD/ITS/YX/75558, pursuant to the paragraph 8(c) of Decision X/3, the Government of Japan would like to submit the following information on innovative financial mechanisms especially on the outcomes of the research and examination on Payment for Environmental Services (PES) and its certification scheme.

I. Payment for Ecosystem Service (PES)

1. Analysis on PES

Focusing on the fact that the loss of biodiversity is known as a negative externality, we conducted an analysis on PES as a political means to address this negative externality and figured out what challenges would exist for the establishment of an effective scheme. The following is the summary of these challenges:

- Where beneficiaries and cost-bearers are identified, it is desirable to decide an amount and means of payment through direct negotiation between them. However, only limited cases of this kind exist around the world.
- While services derived from one ecosystem are diverse, current PES is often intended only for a certain aspect of the ecosystem service. Because of this, it is necessary to consider a means which allows evaluation and payment in multiple ecosystem services in a comprehensive manner.
- In case of PES which uses subsidies from public institutions, it is necessary to consider a means which properly estimates an amount of subsidies provided to cost-bearers who conserve ecosystems, including values of ecosystem conserved as well as values of conservation efforts.

2. Introducing efforts similar to PES in Japan

The following are the examples of some efforts similar to PES in Japan.

(1) Subsidies

Flooding rice paddies during winter in the Kabukuri-numa wetland

Located along the Kitakamigawa River system in Miyagi Prefecture, Kabukuri-numa is a wetland of 150 hectares, which is surrounded by rice paddies that were once part of the wetland.
Kabukuri-numa together with the surrounding rice paddies is the home of rich biodiversity including more than 220 bird species and many precious endangered species. Kabukuri-numa and surrounding rice paddies were collectively registered as a wetland under the Ramsar Convention.

Though it is common for Japanese farmers to drain water from their rice fields in wintertime, the rice paddies surrounding the Kabukuri-numa are filled with water in wintertime and are used as a winter roosting and feeding site for birds. Therefore, as a result of rice paddies fertilized by bird droppings and weeds consumed by birds, a benefit of cultivating rice in a safe and secure way without using artificial fertilizers chemicals is yielded. Furthermore, aquatic organisms, including fish, amphibians, insects and tubifex worms, and summer birds and reptiles which come and prey on them have been found in rice paddies, leading to rich biodiversity.

In the meantime, using the agricultural method of flooding rice paddies during winter has led to reductions of the yield (from 550 to 440 kg per 1,000 square meters) and of revenue (from 198,541 to 130,691 JPY per 1,000 square meters) for farmers. So, the local rice paddies agriculture promotion committee offers farmers, who adopt this farming method, a grant of 8,000 yen per 1,000 square meters of rice fields in order to compensate.

The rice that are grown in winter-flooded rice paddies without agricultural pesticides or chemical fertilizers are sold as premium brand rice, the "*fuyu-mizu-tambo*" rice, being differentiated from rice grown with conventional methods. Distribution routes have also become established with widespread dissemination of the effort, consequently providing favorable sales. Branding of rice has increased 40 percent in sales, compared to rice grown with conventional methods, providing farmers a stable source of revenue. Furthermore, Osaki City, where this method is implemented, offers a grant of 5,000 yen per 1,000 square meters to accommodate costs for the acquisition of third-party certification for the brand of *fuyu-mizu-tambo* rice.

Similar policies of directly paying for environmental-friendly farming practices, together with efforts to sell rice produced as branded rice, have also been implemented in the projects re-introduction of oriental white storks in Toyooka City, Hyogo Prefecture, and crested ibises in Sado City, Niigata Prefecture.

Gap in price and yield between winter-flooded rice and conventionally-grown rice

	Winter-flooded rice	Conventionally-grown rice
Price (Japanese Yen)	24,500	14,000
Yield (kg per 1,000 sq.m)	420	640

(2) <u>Environment taxes</u>

Environment taxes have a potential to contribute to the preservation of biological diversity. Several local governments have introduced the forest environmental tax. Forest has multiple functions for social, economical, ecological and other purposes. One of these functions of forest is biodiversity in providing habitats for species. From this perspective, Japan would like to share its experiences.

<u>The example of forest environmental tax in Kochi Prefecture</u>

The experience of Kochi prefecture is the first example of introducing the forest environment tax in

Japan. Being 84 percent of its land area covered with forests, Kochi Prefecture has the highest forest coverage rate in Japan (Forest Resources Study 2007), but due to conventionally large plantings held repeatedly, and also due to declining woods prices, forest owners lost their incentive for timber production activities and resulting in increasing abandoned and unmanaged forests. Consequently, depleted water source recharge functions, soil runoff, and adverse impacts on river and ocean ecosystems have become serious issues for the living environment of the area. Due to factors including aging of forest owners and stagnant wood prices, it becomes substantially difficult for forest owners to manage forest by themselves. Given these circumstances, in 2003, Kochi Prefecture introduced a "forest environment tax", which aims at protecting forests and is supported by all citizens. This tax not only has conserved forest environment but it also has raised public interests toward forests. Forest Environment Tax of Kochi Prefecture collects 500 yen per capita annually, in addition to the prefectural resident tax, therefore it equalizes burden among individuals and corporate entities. The tax revenue is reserved in the Forest Environment Conservation Fund and then utilized in such manner as reflecting the evaluation by the independent third-party, and as beneficial for forest conservation activities. It also utilized for publicly urgent and important forest improvement operations.

(3) Voluntary efforts of Companies

Conserving water by recharging groundwater in Kumamoto Prefecture

Kumamoto City and surrounding municipalities in Kumamoto Prefecture depend on groundwater to supply 100 percent of its drinking water and one-third of rice paddies. In recent years, however, the groundwater level has been lowered as a result of urbanization. Thus, groundwater recharge measures have been implemented by local firms as well as the Kumamoto City office under the slogan “fully regain the groundwater you used”.

One example of such measures is a company, which provides a reward to farmers who cooperate in promoting underground seepage with their rice paddies or flooding their fallow rice fields with water drawn from a river nearby (Shirakawa). The amount of reward varies according to the length (days) of flooding.

Furthermore, consumption of rice, which is produced in the middle reaches of Shirakawa River, has indirectly contributed to groundwater recharge of rice paddy fields where the rice is produced. Consumption of 1 kilogram of rice in the area is estimated to have an effect of groundwater recharge of approximately 20 to 30 cubic meters.

Local enterprises using large quantities of underground water as industrial water have implemented measures purchasing rice produced in the area at 430 JPY per kilogram (conventionally grown rice at 300 JPY per kilogram). These purchasing activities are being expanded locally, thanks to efforts of local production groups selling the rice produced locally as branded rice.

Recently, a survey has showed that the results of such efforts can contribute to increasing the quantity of spring water from the lake in the city.

II. Certification system

Certification fee, which is collected from certified commodities or products, can be utilized to preserve biodiversity.

While the certification system has a potential to contribute to the objectives of the Convention on Biological Diversity, it still has challenges to be addressed. These challenges could be seen as a discussion point when Parties utilize certification system to preserve biodiversity. Based on this standpoint, Japan has dealt with these challenges of disseminating certification systems, and has specified necessary countermeasures reflecting a wide range of views from national experts and management bodies of certified products.

The Government of Japan would like to submit following experiences and information for reference of Parties.

Challenges and countermeasures for certification systems in Japan

Challenges	Necessary Countermeasures
Obscure differences among certification systems	It is necessary to create a system in which third parties including NGOs can compare differences among systems by using common criteria and convey the results to consumers, after understanding them.
Low level of consumers' awareness on certification systems	Before improving awareness on certification system, it is necessary to improve the understanding values of biodiversity and the importance of conservation.
Low incentive for producers to acquire a certification	It is important that national and local governments provide such assistance required for acquisition of a certification in preparation of a number of documents, in screening process and acquisition costs.
Low incentive for distributors to handle certified products	It is important that a group of distribution companies understand the presence and necessity of certified products contributing to biodiversity.
Consumers do not recognize the effect of certification systems in a quantitative way	It is important that an operational body of each certification system develops a tool to quantitatively recognize its effect for biodiversity conservation and introduces its results to consumers.

Mexico

SECRETARIA
DE
RELACIONES EXTERIORES

DIRECCION GENERAL
PARA TEMAS GLOBALES

DGT-04904/11

La Secretaría de Relaciones Exteriores –Dirección General para Temas Globales- saluda muy atentamente al Secretario Ejecutivo de la Convención sobre la Diversidad Biológica y tiene el honor de hacer referencia a su notificación No. 2011-069, fechada el 01 de Abril 2011, por la cual solicita hacer llegar información relativa a los mecanismos financieros innovadores que potencialmente puedan generar recursos financieros nuevos y adicionales a fin de alcanzar los tres objetivos de la Convención.

Al respecto, la Secretaría de Relaciones Exteriores –Dirección General para Temas Globales- se complace en hacer llegar al Secretario Ejecutivo de la Convención sobre la Diversidad Biológica los comentarios de México relativos a la *Decisión X/3*. Se anexa documento con dichos comentarios.

La Secretaría de Relaciones Exteriores –Dirección General para Temas Globales- aprovecha la ocasión para reiterar al Secretario Ejecutivo de la Convención sobre la Diversidad Biológica, las seguridades de su más alta y distinguida consideración.

México, D.F., a 29 de julio de 2011

SECRETARIO EJECUTIVO DE LA CONVENCIÓN
SOBRE LA DIVERSIDAD BIOLÓGICA
MONTREAL, CANADÁ

DIRECCION GENERAL
PARA TEMAS GLOBALES
SECRETARIA DE
RELACIONES EXTERIORES

ANEXO
DGTG-04904/11

Comentarios de México para la *Decisión X/3* (Notificación 2011-069)

- México considera que los mecanismos financieros son propuestas que van más allá de las convenciones, como impuestos verdes, para que los países desarrollados aporten a los países en desarrollo fondos para la conservación de la Biodiversidad.

- Para nuestro país, algo novedoso para generar fondos nuevos y adicionales, sería proponer un mecanismo financiero propio del Convenio, que salga de los fondos que existen al respecto y cuyos recursos estén de alguna manera relacionados con los servicios que generan los ecosistemas. Este procedimiento tiene un antecedente en las conclusiones del documento "*Milenium Ecosystems Asseessment*".

- México expresa que en ese momento en que todos los países tradicionalmente donantes, Incluido Estados Unidos (que no es parte del Convenio), están pasando por una severa crisis de recursos públicos como consecuencia de la crisis financiera y macroeconómica de 2008-2009, cualquier propuesta que signifique mayor gasto de recursos públicos, y sobre todo para otros países, encontrará trabas en su aplicación.

Moldova

Republic of Moldova information about concept and principles of innovative financial mechanisms.

Day 1, we propose the following generic questions for your consideration/reaction:

(i) What do we mean by innovative financial mechanisms?

Innovative financial mechanism it is need to create enabling conditions for increased government management for local (private) sector support for the implementation of the concept of biodiversity conservation value.

(ii) Why do we have to explore innovative financial mechanisms?

Almost all innovative financing mechanisms rely on a performing institutional environment and thus a well-functioning government and depend on national politics and level.. Voluntary private, nonmarket funding mechanisms are less dependent on these. In this case, Governments it is need to set the rules for markets function to achieve socially desirable results. Each type of financing mechanism has its advantages which must be assessed in each specific situation. There is not one mechanism that is most appropriate under all circumstances. Poverty reduction is becoming increasingly an important factor in ecosystem management and protection.

(iii) What are basic common features of innovative financial mechanisms (apparently individual innovative financial mechanisms may have their own special characters)?

Innovative financial mechanisms is a tool used to implement environmental policy, but without a proper mix of funding and technology, it cannot be effectively enforced. The scale and range of financing should be properly designed and determined according to the environmental policy goals of the state or region.
The primary objective of environmental financing is to raise the funds necessary for special biodiversity protection purposes, but the choice of financial instrument may have far-reaching implications, including various economic and social impacts. Therefore, financial mechanisms should be properly designed so that they can meet multiple economic and social objectives, such as the improvement of economical instruments efficiency, correction of market and government failures, and the achievement of equity goals (i.e., income redistribution, re-adjustment of regional gaps). Among others, improving the efficiency of environmental projects is a key issue to consider in designing functional environmental financing mechanisms, especial for Moldova.. Moreover, in the reform of its economic system, the development of Innovative financial mechanisms focused on marketization is especially vital in order for Moldova to achieve both its economic and environmental objectives. In this regard, the following strategies should be considered in order to address the problems of insufficient investment and low efficiency:
- The roles of the various actors in investment should be clearly defined. Among them, the
Government should play a lead role by (i) implementing and enforcing environmental laws and regulations, (ii) increasing the amount of investment in its fiscal budget, and (iii)
promoting financial procurement from the market.
- Investors other than the Government and polluters should be encouraged in

environmental investment. To this end, the establishment and improvement of market-based financial mechanisms should be given high priority.

- **biodiversity conservation should be designated as priorities in the efforts to establish effective environmental financing mechanisms.**

(iv) What common steps are involved in advancing innovative financial mechanisms?

General steps to involved creation of innovative financial mechanisms, could be following activities:

1. **The feasibility of establishing markets for ecosystem services, including consideration of the transaction costs associated with creating such markets;**
2. **The degree of complexity involved in bundling various ecosystem services in an integrated manner so that markets for composite services can be created;**
3. **The issue of determining the true value of specific ecosystem services;**
4. **The possible use of current institutional structures within the MEAs to operationalize or support the creation of markets for ecosystem services;**
5. **The modalities to ensure that access to markets for ecosystem services is equitable and that proceeds from these markets are distributed in a fair manner among the social groups directly affected by these ecosystem services;**
6. **The ways and means to integrate these initiatives within national poverty reduction strategies and national budgets; and**
7. **The level and type of trading platform that is optimal for each ecosystem service (e.g. a global trading platform for carbon credits etc.).**

(v) Is it necessary to have strategies or plans for exploring innovative financial mechanisms? If yes, what are essential elements in such strategies or plans?

There are, many extant strategies, programs plans related to the some important key of biodiversity objectives – conservation of biodiversity, sustainable use of biological resources and the equitable sharing of benefits. However, most of these strategies, programs plans focus on specific goods such as organic foods or sustainable timber, or specific services such as ecotourism, and do not directly focus on the natural areas affected by the provision of these goods and services. Thus a „biodiversity standard. could include existing strategies, programs plans for social and environmental responsibility plus additional commitments as appropriate to ensure that biodiversity is conserved and used sustainably. In this respect, a new strategy for innovative financial mechanisms should use existing biodiversity-relevant strategies, programs plans where these are credible and seen to represent best practice in the field concerned.

(vi) Do we need overarching principles on innovative financial mechanisms? If yes, what principles should we have?

YES, is necessary.
Almost all innovative financing mechanisms rely on a performing institutional environment and thus a well-functioning government. Voluntary private, nonmarket funding mechanisms are less dependent on these. In this case, Governments it is need to set the rules for markets function to achieve socially desirable results. Each type of financing mechanism has its advantages which must be assessed in each specific situation. There is not one mechanism that is most appropriate under all circumstances. Poverty reduction is becoming increasingly an important factor in ecosystem

management and protection. The issue of who has rights over what and receives funding thus is important in implementing financing mechanisms.

(vii) What factors are important for achieving success on innovative financial mechanisms? Is there any lesson to learn?

Almost all innovative financing mechanisms rely on a performing institutional environment and thus a well-functioning government. Voluntary private, nonmarket funding mechanisms are less dependent on these. In this case, Governments it is need to set the rules for markets function to achieve socially desirable results. Each type of financing mechanism has its advantages which must be assessed in each specific situation. There is not one mechanism that is most appropriate under all circumstances. Poverty reduction is becoming increasingly an important factor in ecosystem management and protection. The issue of who has rights over what and receives funding thus is important in implementing financing mechanisms.

DAY 3

For day 3, we propose that you focus on reflecting what policy approach is preferable. If you prefer an interventionist approach, what will be your preferred sequence of (what) policy interventions on markets for ecosystem goods and services in the coming months and years? In other words, should one or two mechanisms be tested or promoted first? If yes, which should go first?

In our opinion, policy interventions is very important. It is need to establish a set of rules on how the ecosystems goods is managed, and on how user rights and responsibilities are distributed. These rules need to include the incentives, safeguards; dispute resolution processes and enforcement mechanisms used to control and co-ordinate the actions of various self-interested stakeholders, interacting in a bilateral and multilateral exchange relationship

An important precondition for financing mechanisms is that a well-functioning governance regime in place. If this is not the case, then either the willingness to invest in ecosystem management disappears, especially when funds are mismanaged because of a faulty governance regime. One may make the argument that in order to have a well-functioning governance regime, sufficient funding is needed. The political regime that manages ecosystems in a sustainable manner and that provides ecosystem functions, consists of a property rights structure and a set of rules that determines how the ecosystem area is managed.

Mrs. Ala Rotaru, CBD National Focal Point, Head of Natural Resources and Biodiversity Division, Ministry of Environment, Republic of Moldova

Mr. Lazar Chirica - expert in ecology, biodiversity and geography, ecosystems services in the "Top Geo Proiect Company" and member of NGO "CENTER FAGUS"

Norway

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Your ref	Our ref	Date
	201102640-/EMI	17 AUG 2011

Submission of information concerning innovative financial mechanisms, pursuant to decision X/3, A, paragraph 8(c)

The CBD resource mobilization strategy aims to assist Parties and relevant organizations in exploring new and innovative financial mechanisms at all levels with a view to significantly increasing the source of funding to support the achievement of the Convention's three objectives. The strategy considers a wide range of possible funding sources, both public and private, and is geared towards implementation during an initial period up to 2015, coinciding with the development planning cycle, including the Millennium Development Goals. As with Climate Change financing, funding for biodiversity will need to come from a wide variety of sources, including alternative sources of finance, the scaling up of existing sources and increased private flows. Experiences form Climate Change financing is highly relevant for biodiversity financing, both for lessons learned and as joint resource streams e.g. REDD, LULUCF and ecosystem based adaptation.

The high-level advisory group on climate change financing[1] points out that new public instruments based on carbon pricing are important for mobilizing both public and private climate financing. While 50% of the funding identified by the group to reach the goal of USD 100 billion was market based, the recently released TEEB for Business Report [2] assess the emerging markets for biodiversity and ecosystem services to add up to USD 480 billion a year by 2020. With such promising numbers it might be argued that biodiversity finance could be left to the market alone. However, the market opportunities outlined in the TEEB report are not yet fully developed. The national follow up of TEEB- activities may also increase resources to support the achievement of the Convention's three objectives. To explore further some of the opportunities and potential pitfalls of the innovative market based mechanisms

[1] Report of the Secretary-General's High-level Advisory Group on Climate Change Financing, November 2010

[2] The Economics of Ecosystems and Biodiversity (TEEB) for Business: Executive Summary, 2010, page 11, Chapter 5, page 33, see: http:/teebweb.org/.

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for biodiversity, Norwegian Agency for Development Cooperation (Norad) commissioned a study to examine the most discussed market-based instruments and financial mechanisms within the conservation debate.
The study is used as a basis for the Norwegian response to CBD Decision COP X/3, A, paragraph 8(c), inviting parties, relevant organizations and initiatives such as the World People's Conference on Climate Change and the Right of Mother Earth, to submit information concerning innovative financial mechanisms that have potential to generate new and additional financial resources as well as possible problems that could undermine achievement of the Convention's three objectives; conservation, sustainable use and benefit sharing of genetic resources.

An international team, headed by Professor Arild Vatn at the Norwegian University of Life Sciences was selected for the study. The aim of the study has been to examine the opportunities and limitations of the most discusses marked-based instruments and financial mechanisms within the conservation debate. The report is divided into three parts: 1) general evaluation of market-based mechanism, their foundations and demands, 2) an analysis of experiences, with some key examples, mainly payment for ecosystem services (PES) and the associated system of conservation trust funds, and 3) other mechanisms that may be considered more experimental such as PES procurement auctions, habitat banking and ecological fiscal transfers. The potential to reform subsidies is also included in the analysis. The study does not cover payments for bio-prospecting and biodiversity based commodities such as eco-certified products and ecotourism. It does however track experiences of PES and other market based mechanisms for finances in both developed and developing countries. In this respect it goes outside of the innovative development finance discourse, which focuses on the search for "innovative " or alternative sources of Official Development Assistance to help finance achievement of the Millennium Development Goals.

Innovative development finance involves nontraditional applications of solidarity, Private Public Partnerships (PPP), and catalytic mechanisms that (i) support fundraising by tapping new sources and engaging investors beyond the financial dimension of transactions, as partners and stakeholders in development; or (ii) deliver financial solutions to development problems on the ground. Even though the scopes are different, the report comes to the same conclusions on lessons learned as the World Bank study on innovating development finance [3]:

- Success depends on robust regulatory regimes and clear agreement of roles and responsibilities;
- High start up and running costs of certain schemes have been noted and more in-debt evaluation will be required to determine the value-added and net benefits of fund-raising efforts and financial solutions.

The most surprising finding in the report is that in all the PES systems for biodiversity studied, the state plays a key role, not only in defining rights/caps, but also as a buyer. As much as 99 per cent of payments derive from public sources, while this percentage is 97 for developing countries. In all the PES cases studied, payments go to land-owners, implying that they are implicitly granted the right to existing practices. As most of the PES examples

[3] CFP Working Paper series no. 1, Innovating Development Finance. From Financing Sources to Financial Solutions, by Navin Girishankar, 2009.

studied have been in operation for more than 10 – 20 years, the dominating role of government funding cannot be explained by high start up costs. High transaction costs seem to be a core explanation for the extensive involvement of public authorities.

The report emphasizes that establishing markets requires government actions and interventions. The most fundamental action is the definition of rights, as it is crucial for creating financial flows for biodiversity. Hence, public authorities have to specify if rights should rest with traditional right holders and land-owners or with those benefiting from biodiversity and ecosystem services, i.e., whether the 'provider gets' or the 'polluter pays' should take precedence. In this regard it might be relevant to draw the attention to target fourteen of the CBD Strategic Plan 2010-2020.

Establishing rights to facilitate market trades demands that the goods or services involved are well defined and demarcated. The report points out that this is particularly demanding in the case of biodiversity and ecosystem services. Such goods and services are the result of complex processes that are interlinked and difficult to demarcate. Moreover, they have different values and meanings for each individual and also for each country. Information costs are very high. Hence, where payments are used, they are typically linked to proxies in the form of e.g., certain practices or management options, rather than the services themselves. In this respect biodiversity finance do not differ from climate finance. Together with the multidimensional nature of the values involved in biodiversity, this implies limitations to using markets for biodiversity protection.

The systems studied in the report are evaluated using a common set of criteria:

- Legitimacy of process
- Legitimacy of outcomes:
    - Effectiveness (delivery of services; additionality; permanence; leakage issues)
    - Efficiency (cost-effectiveness; opportunity and transaction costs)
    - Equity (distributional effects)

The choice of system implies a choice between different governance structures where the legitimacy of the actual processes – how various groups are involved – is often as important as the outcomes themselves. With respect to the increased use of markets, the question is as much about whether this is a legitimate way to treat environmental values, as it is about whether the markets may work well from a purely functional perspective.

New varieties of financial mechanisms, such as PES procurement auctions, ecological fiscal transfers and habitat banking, may potentially play a greater role in the future mix of instruments used to increase financing for conservation, and potentially create more appropriate incentives.

The report concludes that market based instruments for biodiversity is to a large extent experimental and that several challenges are emerging. The main concern is the very legitimacy of using markets to ensure biodiversity protection in the first place. While trading is thought to have the capacity to reduce costs and increase effectiveness, the report points out that there are several uncertainties and problems involved. These concern not least aspects of quality. The report observes several challenges here. Markets can capture only a subset of the

values involved. In fact, markets do not provide the best conditions to trade environmental values and goods. They are, moreover, best at handling well demarcated and discrete assets.

The High-level Advisory Group on Climate Change Financing points out that instruments based on carbon pricing are particularly attractive because they both raise revenue and provide incentives for mitigation actions. The same cannot be said for biodiversity. A common biodiversity currency does not exist and none of the innovative financing schemes for biodiversity is close to defining such a currency. Tradable assets linked to new instruments such as habitat banking can be used in relation to development rights in a region but not as a tradable global asset. On the other hand the rich experiences of different government PES schemes for biodiversity in developed countries should be a good basis for developing similar PES schemes in developing countries. Tax and subsidy reforms are at the core of these systems and needs to be looked into more closely.

The report covers only a limited number of the market opportunities outlined in the TEEB report. Certified agricultural products, voluntary biodiversity offsets and bio-prospecting contracts are assumed to generate more than USD 300 billion per year. The general conclusions of the report regarding legitimacy is, however as valid for these markets, as for the selected markets studied in the report. The report documents that governments need to play a major role in creating and regulating markets. To realize the full economic potential of innovative financing for biodiversity, public and private investments to improve the knowledgebase and management of biodiversity is needed. Hence, the issue is not only about 'how much market', but also about the role of governments in forming and regulating markets.

Please find attached the report "Can markets protect biodiversity- an evaluation of different financial mechanism". The report does not reflect official positions or policies of the Norwegian government, but is meant as an input to address CBD decision X/3, A, paragraph 8(c).

Yours sincerely,

Birthe Ivars
Deputy Director General

Emine Isciel
Adviser

Can Markets Protect Biodiversity?

An Evaluation of Different Financial Mechanisms

By Arild Vatn, David N. Barton, Henrik Lindhjem, Synne Movik, Irene Ring and Rui Santos

Noragric Report No. 60
Department of International Environment and Development Studies
Noragric

CAN MARKETS PROTECT BIODIVERSITY?

AN EVALUATION OF DIFFERENT FINANCIAL MECHANISMS

by

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PREFACE

This report discusses the strengths and weaknesses of increased use of market-based mechanisms in protecting biodiversity and its associated services. It has been written in response to the latest call by the Conference of the Parties to the Convention on Biodiversity (COP 10, Nagoya) where Parties were invited to submit information concerning to what extent innovative financial mechanisms could be used to support the three objectives of the convention.

The report has been funded by the Norwegian Agency for Development Co-operation (NORAD), and is the result of cooperation between researchers at the Department of International Environment and Development Studies (Noragric) at UMB and the Norwegian Institute for Nature Research (NINA). David N. Barton and Henrik Lindhjem have participated from NINA, while Synne Movik and Arild Vatn have represented Noragric. Irene Ring from the Helmholz-Centre for Environmental Research (Germany) and Rui Santos from New University of Lisbon have also participated as co-authors of parts of the report.

On behalf of the authors,

Noragric, UMB, 26.05.11
Arild Vatn

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ACRONYMS

A$	Australian dollar
BBOP	Business and Biodiversity Offsets Programme
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
COP	Conference of the Parties
CRP	Conservation Reserve Program
CTF	Conservation Trust Fund
EBI	Environmental Benefit Index
EFT	Ecological Fiscal Transfer
EFTEC	Economics for the Environment Consultancy (U.K.)
EIA	Environmental Impact Assessment
ES	Ecosystem services
EU	European Union
EU FP7	EU 7th Framework Programme
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
ICMS	*Imposto sobre Circulação de Mercadorias e Serviços*
LULUCF	Land use, land use changes and forestry
MBI	Market-based Instruments
MEA	Millennium Ecosystem Assessment
MES	Markets for Ecosystem Services
NINA	Norwegian Institute for Nature Research
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
PDR	Purchase of Development Rights
PES	Payment for Ecosystem Services
PGP	Provider Gets Principle
PPP	Polluter Pays Principle
PS	Present status
REDD	Reducing Emissions from Deforestation and Forest Degradation
SEA	Strategic Environmental Assessment
TEEB	The Economics of Ecosystems and Biodiversity
TDR	Tradable Development Rights
UMB	Norwegian University of Life Sciences
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	US dollar
VAT	Value Added Tax
WWF	World Wide Fund for Nature

SUMMARY

There is an increasing anxiety that the international community is not making sufficient effort to halt the loss of biodiversity. Currently, new ways are sought to increase the financial basis for biodiversity protection. At the 10th Conference of the Parties (COP) to the Convention on Biological Diversity (CBD) in Nagoya in 2010, it was decided to invite the Parties "… to submit information concerning innovative financial mechanisms that have potential to generate new and additional financial resources as well as possible problems that could undermine achievement of the Convention's three objectives".

This report is a response to this demand. The aim has been to examine the opportunities and limitations of the most discussed market-based instruments and financial mechanisms within the conservation debate. While the analyses are general, there is some specific emphasis on issues of relevance for developing countries. The report is divided into three parts. The first part contains a general evaluation of market-based mechanisms, their foundations and demands. The second part is oriented towards an analysis of experiences, with some key examples of present market oriented systems, mainly payments for ecosystem services (PES) and the associated system of conservation trust funds. In the last part we look at several mechanisms that may be considered more experimental – at least in a developing country context. These include PES procurement auctions, habitat banking and ecological fiscal transfers. The potential to reform subsidies is also included in the analysis.

General findings

The idea of making more extensive use of market-based mechanisms – as opposed to legal regulations or public payments – seems to partly reflect the prevalent belief that such mechanisms will be more efficient. There is also the notion that markets may be better at raising the necessary funds. The report emphasizes that establishing markets necessitates government actions. The most fundamental such action is defining rights, as the clear definition of rights is crucial for creating financial flows for biodiversity protection. Hence, public authorities have to specify if rights should rest with land-owners or with those wanting protection, i.e., whether the 'provider gets' or the 'polluter pays' principle should take precedence.

Establishing rights to facilitate market trades demands that the goods or services involved are defined and demarcated. This is particularly demanding in the case of biodiversity and ecosystem services. Such goods and services are the result of complex processes that are interlinked and difficult to demarcate. Information costs are very high. Hence, where payments are used, they are typically linked to proxies in the form of e.g., certain practices or management options, rather than the services themselves. The multidimensional nature of the values involved, and the fact that it is often not meaningful to measure or define biodiversity in monetary terms, implies further limitations to using markets as a way of ensuring biodiversity protection. Finally, ecosystem services are inherently public goods. In a market context, this creates free-rider problems, which poses severe restrictions on the way such markets may work.

The systems studied in this report can be grouped into two broad categories. First, there are payment systems, so-called 'payments for ecosystem services' (PES). Then there are various types of cap-and-trade systems. In the case of PES, it is the payment that is creating the incentive

for protecting biodiversity or ensuring sustainable use. In the case of cap-and-trade, it is the cap that plays this role. The market – the trade – is established to reduce the costs of imposing the cap. The CBD emphasizes both conservation and sustainable use, and most systems discussed in this report are compatible with both objectives to varying degrees.

In all the systems we have studied, the state plays a key role, not only in defining rights/caps, but often also as a buyer. Creating markets is demanding. In addition to the issues of rights and demarcating the services, making the deals and ensuring that services are delivered is also costly. The number of sellers and buyers are usually high, and they are often spatially distributed. This implies that transaction costs are high – often prohibiting trades. Finally, public authority may be necessary to get around the free-rider problems, which underscores the crucial role that public authorities play in terms of establishing markets. Moreover, a major part of financial mechanisms studied in this report are all based on public programs. Hence, we observe that public authorities cannot just 'leave the problem' to markets. They have to create them and provide support or establish public programs.

Criteria for evaluation

The systems studied are evaluated using a common set of criteria:

- Legitimacy of the process
- Legitimacy of outcomes:
    - Effectiveness (delivery of services; additionality; permanence; leakage issues)
    - Efficiency (cost-effectiveness; opportunity and transaction costs
    - Equity (distributional effects)

The choice of system implies a choice between different governance structures where the legitimacy of the actual processes – how various groups are involved – is often as important as the outcomes themselves. With respect to the increased use of markets, the question is as much about whether this is a legitimate way to treat environmental values, as it is about whether markets may work well from a purely functional perspective.

Experiences with payments for ecosystem services

Looking into the specificities of each system studied in this report, PES for biodiversity protection is mostly presented as a market-based solution. Milder et al. (2010) estimate the volume of PES to be about 1,460 million USD/yr. Of this about 87 per cent is used in developed countries. A somewhat surprising finding is that as much as 99 per cent of payments derive from public sources, while this percentage is 97 for developing countries. In all the cases we have studied, payments go to land-owners, implying that they are implicitly granted the right to existing practices. High transaction costs seem to be a core explanation for the extensive involvement of public authorities. Several developing countries have established Conservation Trust Funds to operate as intermediaries between 'buyers' and 'sellers', with the aim of attracting private funds. However, public funds dominate even in these cases. So while firms and individuals do engage, the level of engagement apparently remains relatively marginal.

It is notable that little information exists on the effectiveness of PES on biodiversity conservation and sustainable use. Experience from Cost Rica – a pioneering country on PES – indicates that while effects are observed locally particularly for forest regeneration, it is hard to determine any

aggregate effect on avoided deforestation for the country as a whole. Moreover, equity issues are often raised in the literature, emphasizing that if development is to be a part of PES, specific actions are needed. Drawing on studies of the carbon market, we also document that the motivations of the actors involved depends on the system. Studies reveal that firms voluntarily engaged in PES were more willing to pay extra for ensuring development than firms involved in the Clean Development Mechanism (CDM), a kind of cap-and-trade system under the climate regime. This phenomenon was observed despite the fact that there is an explicit development component included in CDM.

Experiences with new and more experimental approaches

New varieties of financial mechanisms, such as PES procurement auctions, ecological fiscal transfers and habitat banking, may potentially play a greater role in the future mix of instruments used to increase financing for conservation, and potentially create more appropriate incentives.

PES procurement auctions are considered an alternative or supplement to ordinary fixed-price or bilaterally negotiated PES schemes. With the state as buyer, the main idea is to introduce competition between landowners so that their true opportunity costs are revealed. The auction can therefore help the regulator achieve environmental objectives at lower costs and ensure a higher degree of additionality. However, PES auctions are still in their infancy internationally, though USA, Australia and a few other countries have been experimenting with such auctions. The functioning of PES procurement auctions in terms of process legitimacy, effectiveness, efficiency and equity is likely to be quite case-specific, and will depend on design elements of auctions, such as the bidding rules, to what extent information is shared, how bids are evaluated and ranked, etc. As auctions are relatively more complex, they have a higher risk of failure than a fixed-price scheme. Hence, more testing is likely to be required before conservation auctions are rolled out, especially in developing country contexts

Biodiversity offsetting is based on the idea that reduction of biodiversity at one place, the development site, can be compensated by action increasing biodiversity at another, the rehabilitation site. It can be based on a regulatory approach implying a liability to compensate damages from development. Both tradable development rights (TDR) and habitat banking are market-based instruments with trading as their main feature. Governments define a development cap, such as a percentage of land declared not available for development, or a conservation objective such as 'no net loss' of biodiversity. In principle, trading TDR/offsets in a market can then achieve the cap/objective at lower cost. Habitat banking opens up the scope for finding trades with even greater differences in opportunity cost by allowing credits to be banked over time. Experiences are limited to a few countries, mostly high and middle income and little empirical evidence is as yet available on the cost-effectiveness as compared to traditional regulation. Conclusions regarding potential cost-effectiveness rely on a wide array of assumptions about availability of land for trading, effectiveness in monitoring, mitigation and rehabilitation actions, assessing equivalence in habitats between development and rehabilitation sites, and compensating for inequities between stakeholder in time and across locations. In other words, transaction costs are high and there are reasons to expect them to be largely borne by the public sector. It is an empirical question whether transaction costs are outweighed by the differentials in opportunity costs between development and rehabilitation sites. It is also open to conjecture whether cost savings compensate for ineffective rehabilitation actions observed in the few pilot case studies available.

Ecological fiscal transfers (EFTs) are pioneered in Brazil, Portugal and to some extent in Germany. Decisions about where conservation areas are to be sited are frequently taken at higher levels of government, even though the costs of losing those areas for other social and income-generating developments are borne by the local governments and communities. EFTs are therefore seen as a new instrument that provides incentives for local governments to support and maintain nature conservation areas within their territories, but that can also provide wider ecological benefits beyond municipal boundaries. By building on existing intergovernmental fiscal transfer schemes, transaction costs can be kept low. Transaction costs increase where EFTs aim at going beyond mere compensation, to providing conservation incentive effects through higher compensation related stricter protection measures. The funding on which fiscal transfers are based may derive from tax revenues or redistribution of international transfers of funds such as REDD+. By addressing local government land-use decisions, ecological fiscal transfers complement a policy mix of economic and regulatory instruments largely addressing private actors.

Subsidy reform is the last action discussed in this report. It is not a new mechanism as such, but is still an important component of any mix of instruments to increase potential financing for conservation and create more appropriate incentives. Reduction of environmentally harmful or other unjustified subsidies will both free up resources in government budgets and make resource use more efficient. Reform processes are in their infancy in most parts of the world and substantial progress is necessary. Subsidies are introduced and maintained for various social, environmental and economic reasons. Many of these are both valid and/or politically rational reasons, such as those underpinning many PES schemes. While renaming ‘subsidies’ as ‘payments’ may appear to increase their legitimacy, caution is necessary. Even so-called ‘green’ subsidies may not be well-targeted or cost-effective, as also observed for several PES schemes. Removing or reducing subsidies that no longer have legitimate objectives is often a painful process for the interest groups that stand to lose. Potential conflicts can be alleviated through broad stakeholder engagement, transitional assistance, and increased transparency. The current emphasis on fiscal austerity measures by many governments during the financial crisis may create a window of opportunity for subsidy reform.

Closing remarks

Market-based instruments for biodiversity protection are to a large extent experimental and several challenges are emerging. The main concern is the very legitimacy of using markets to ensure biodiversity protection in the first place. This report has documented that governments need to play a major role in creating and regulating markets. Hence, the issue is not only about ‘how much market’, but also about the role of governments in forming markets. While trading is thought to have the capacity to reduce costs and increase effectiveness, there are several uncertainties and problems involved. These concern not least aspects of quality. We observe several challenges here. Markets can capture only a subset of the values involved. They are, moreover, best at handling well demarcated and discrete assets. Biodiversity is, however, a *system* good that is not very conducive to piecemeal strategies. What is desired is not fragmented pockets of particular ecosystem services, but the overall viability of complex systems. Ensuring that the notion of substitutability characterizing trades in offsets does not adversely impact on ecosystem function and environmental qualities is vital. This report provides an overview of the way these various challenges play out in different settings. It is a political matter to assess the relative importance of the insights and arguments it contains.

INTRODUCTION

It is now widely acknowledged that biodiversity is vital for human wellbeing, and that the current trend of declining biodiversity represents a threat to human welfare. In response to the mounting anxieties about accelerating biodiversity loss, the Convention on Biological Diversity (CBD) was established in 1992 at the behest of the United Nations Environment Programme (UNEP). The Convention is governed by the Conference of the Parties (COP), which holds regular meetings to discuss issues relating to its implementation. The Convention has three main objectives, namely conservation of biological diversity, the sustainable use of its components, and the fair and equitable share of the benefits arising from the utilization of genetic resources. These objectives are ambitious and necessary, but not easily achieved.

With respect to the overarching mandate of halting biodiversity loss and the objective of conserving biodiversity, there is a growing emphasis on finding appropriate economic tools to provide the right incentives to aid conservation efforts and sustainable use of biodiversity. In his opening address to the COP 10 in Nagoya, the Executive Director of UNEP Achim Steiner emphasized that while science is a vital tool in the investigation of the root causes of biodiversity loss and to demonstrate the links between biodiversity and other issues, economics is the key to address the issue (COP 10 2010a: 10). While it has been argued for some time that the failure to account for the full economic value of ecosystems and biodiversity is a primary cause of the continued loss of diversity and degradation of resources (TEEB 2010), increasing focus is being placed on finding economic instruments that provide both incentives to and additional financial resources from private and public actors. This increasing focus stems from the belief that, by drawing on market mechanisms, more cost-efficient solutions might be found to conservation challenges, as actors are stimulated through competition to come up with new ways of safeguarding environmental assets.

Articles 20 and 21 of the Convention spell out the need for putting in place appropriate mechanisms and architectures for financing conservation efforts. Article 21 states that "There shall be a mechanism for the provision of financial resources to developing country Parties for purposes of this Convention on a grant or concessional basis (…) The mechanism shall function under the authority and guidance of, and be accountable to, the Conference of the Parties for purposes of this Convention" (United Nations 1992). A draft strategy for resource mobilization that outlined funding targets, indicators and concrete activities and initiatives, as well as implementation and monitoring arrangements, was presented in May 2008 at the 9th COP meeting. The resource mobilization strategy was taken a step further at the 10th meeting of the COP in October 2010, in Nagoya, Japan. It was decided (decision X3, point 8(c)) to invite the Parties "… to submit information concerning innovative financial mechanisms that have potential to generate new and additional financial resources as well as possible problems that could undermine achievement of the Convention's three objectives" (COP 10 2010b).

This decision should be seen in the light of the increasing importance attached to the adoption of market-based mechanisms in natural resource management – cf. water, forests and carbon/climate change. It is important to enhance the financial basis for biodiversity protection, with an increasing emphasis on involvement of the private sector. Market-based instruments are also

increasingly proposed to better reflect the value of biodiversity/ecosystem services in market prices. However, expanding the role of markets is neither an easy nor an unproblematic avenue to walk. It raises issues concerning what are appropriate ways to protect biodiversity. Moreover, many demanding institutional changes will be needed, which is a challenge not least in developing country contexts. At the same time, it is here the need for finding additional financial resources is the greatest.

The aim of this report is, therefore, to discuss the opportunities and limitations of the most discussed market-based incentives and financial mechanisms as proposed in the conservation debate. The report is divided in three. The first part is focused on a general evaluation of the opportunities and limitations related to using market-based mechanisms. This section is written by Arild Vatn, Synne Movik and David N. Barton. The second part is oriented towards an analysis of experiences with some core examples of present market oriented systems – mainly payments for ecosystem services (PES) and the accompanied system of conservation trust funds. The analyses presented here are undertaken by Arild Vatn and Synne Movik. In the third part we examine mechanisms that are more recent and experimental – at least in a developing country context, and partly even for developed countries. Mechanisms discussed include PES procurement auctions, tradable development right/habitat banking, and ecological fiscal transfers, in addition to the reforms concerning use of subsidies, as this is a precondition in many cases for introducing new instruments. This final part is written by David N. Barton, Henrik Lindhjem, Irene Ring and Rui Santos.

While the main focus of this report is on biodiversity, we will include experiences from other relevant fields like water protection and carbon mitigation when relevant. While biodiversity protection has specific characteristics, lessons can be learned from the other fields. As there are typically more examples of market-based mechanisms in especially water and carbon services, it is of special interest to understand why this is so.

Part I:

OPPORTUNITIES AND LIMITATIONS OF VARIOUS FINANCIAL MECHANISMS TO PAY FOR ECOSYSTEM SERVICES

by

Arild Vatn, Synne Movik and David N. Barton

Introducing market-based mechanisms to ensure the delivery of ecosystem services is seen as a potential solution to the great challenges humanity is facing concerning environmental deterioration. It is, however, also acknowledged that applying market-based approaches is demanding in many respects. For one thing, it is difficult to raise the necessary finances. It is also challenging to construct ways of distributing these resources such that they reach the 'right' people and create the appropriate incentives – which in turn raises issues regarding how to measure the values involved, who should pay and how to make them pay, how should money be transferred and how is it possible to ensure that payments influence end receivers in the manner desired? More fundamentally, the question concerns when market-based systems are appropriate and when not.

The aim of this part of the report is to clarify what these issues imply for creating a stronger financial basis for biodiversity protection. We start by looking at the causes of biodiversity loss. Successful policies – whether market-based or not – need to be founded on a clear understanding of what brings about biodiversity loss. Next we present a short overview of existing financial mechanisms for ecosystem services. Thereafter, a series of sections follow in which we discuss various aspects of creating markets for ecosystem services/biodiversity protection.

Before we start on our journey into the above issues, it should be noted that it is not easy to define what is and what is not a market-based mechanism. We notice that public bodies often act as 'buyers' or 'sellers' of ecosystem services. This is not least the case for payments for ecosystem services. Instead of applying a very strict definition of market-based mechanisms, we will rather apply the broader concept of financial mechanisms. The fact that it is difficult to draw a clear line concerning this issue reflects that practice is full of various mixes of public and private, of market- and command-based systems. In the conservation policy literature 'economic instruments' has been employed to encompass roughly the same set of policies as assessed in this report – also involving different combinations of instruments (Ring et al. 2011).

1. WHAT CAUSES BIODIVERSITY LOSS?

The Millennium Ecosystem Assessment (2005:2) states very emphatically that "Human actions are fundamentally, and to a significant extent irreversibly, changing the diversity of life on Earth, and most of these changes represent a loss of biodiversity. Changes in important components of biological diversity were more rapid in the past 50 years than at any time in human history. Projections and scenarios indicate that these rates will continue, or accelerate, in the future." Tentative estimates put the rate of biodiversity loss at one thousand times higher than the background and historical rate of extinction (GBO3 2010).

However, measuring biodiversity loss with accuracy is a challenge. Ecosystems are very complex, and that diversity spans different scales. Consequently, it becomes difficult to use one particular indicator – e.g. species diversity – to monitor biodiversity changes. Establishing a set of indicators necessitates consensus on what kind of criteria should guide the choice. At present, the purposes for which indicators are applied, and sometimes also the indicators themselves, differ depending on whether they are defined in the realm of ecological science or environmental policy. There exists a variety of indicators that are giving rise to a range of, mostly incompatible, monitoring systems (Feld et al. 2009), and there is thus a need for greater transparency in the definition of criteria and selection of indicators, as well as empirically testing their relevance and usefulness (Heink and Kowarik 2010). (Feld et al. 2009:1862) note that "Despite great effort to develop indicator systems over the past decade, there is still a considerable gap in the widespread use of indicators for many of the multiple components of biodiversity and ecosystem services, and a need to develop common monitoring schemes within and across habitats. Filling these gaps is a prerequisite for linking biodiversity dynamics with ecosystem service delivery and to achieving the goals of global and sub-global initiatives to halt the loss of biodiversity."

Relating to drivers of change, the distinction between direct and underlying causes of biodiversity change is often not as clear as it may appear. There are long, complex causation chains that eventually lead to a loss of biodiversity, and few cause-effect chains are linear or unidirectional. Analyses of change are further complicated through the existence of particular feedback loops that are not easily traced (EU 2009). Despite these difficulties, it is possible to outline some main trends and drivers of biodiversity change. Five main human-induced indirect drivers of biodiversity loss can be identified: demographic, economic, socio-political, cultural and religious, and scientific and technological (MEA 2005). Increasing populations have profound implications on the world's ecosystems, not least through the increased consumption of ecosystem services. Globalization and economic growth drive ecosystem change through shaping the patterns of production. Socio-politically, there are positive dimensions with respect to biodiversity conservation, through, e.g., the trend towards greater democracy and the decline of centralized authoritarian states, which opens up for more adaptive management of environments. Culture and religious beliefs, for their part, fundamentally affect people's ideas of what they consider important, which in turn have implications for conservation practices and consumer preferences. Finally, technological change could be both a positive and negative factor. It may result in new pollutants and in access to resources that were previously 'naturally' protected. It may also reduce pressures to the extent that less resources is needed per unit of output.[1]

[1] The more technical relationships included in the above are often captured in the I=PAT formula, where I is impact, P is population, A is affluence and T is technology

Flowing from such indirect drivers are the more direct drivers of ecosystem change, such as habitat transformation, overexploitation, invasive alien species, pollution, the withdrawal of water and physical modification of rivers, and climate change – cf. Figure I.1. The single most important driver of biodiversity loss over the last century is habitat transformation, which is caused by the expansion of agriculture – cropland currently covers a quarter of Earth's surface – as well as urban sprawl, transportation infrastructure and deforestation (EU 2009, MEA 2005). According to EU (2009), agriculture causes the greatest impact on a global scale, followed by infrastructure development and deforestation.

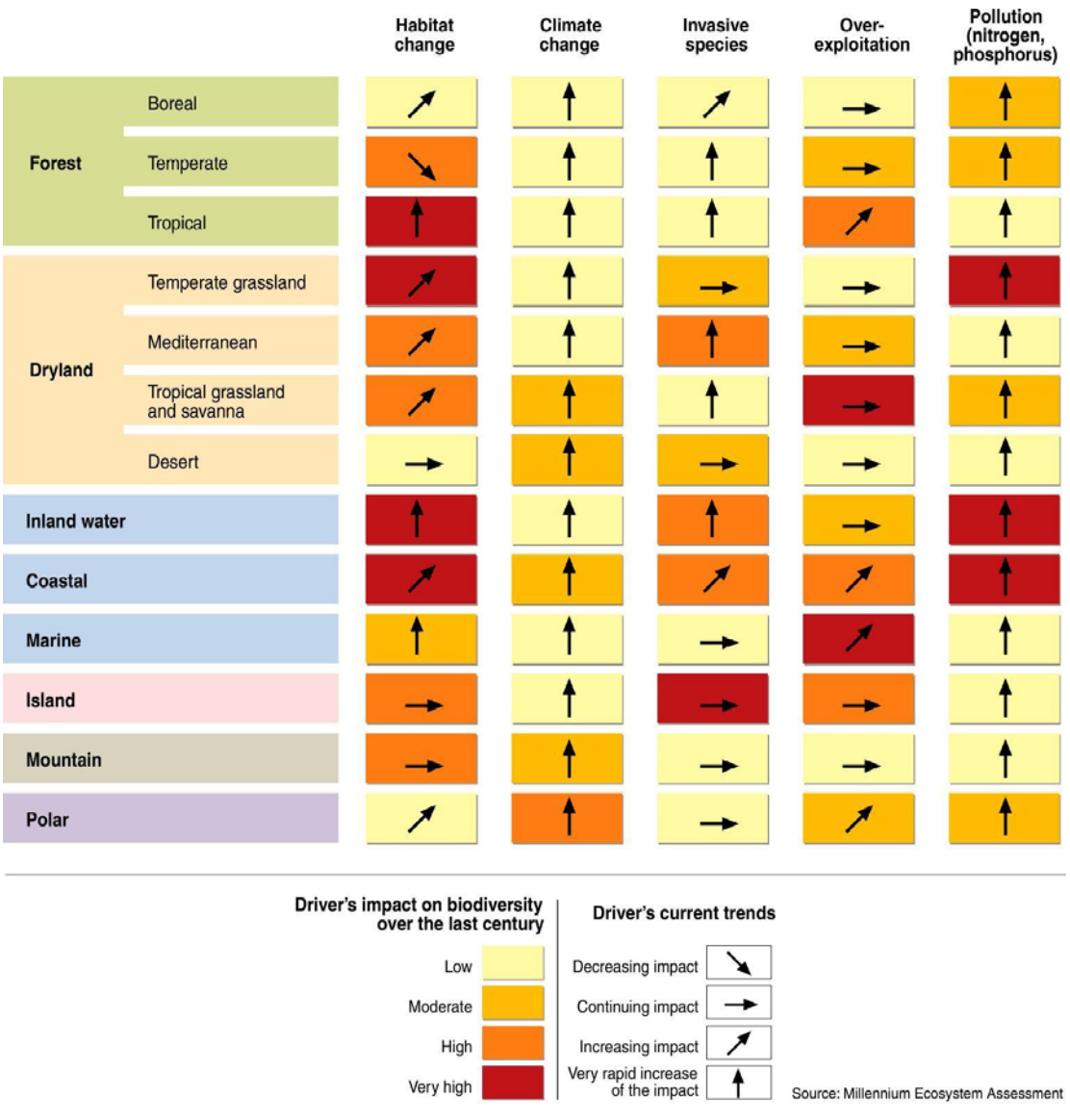

Figure I.1. Drivers of change in different biomes

Source: Millennium Ecosystem Assessment (2005)

Too intensive harvesting of resources is another significant driver, in particular affecting marine ecosystems. For example, since the emergence of the practice of industrial fishing, fish biomass has been reduced by roughly 90 per cent compared to pre-industrial levels, and three-quarters of the world's fisheries are either fully exploited or over-exploited (MEA 2005). Invasive alien species is an expanding problem, caused in part through increased trade and tourism which has the side-effect of assisting the spread of such alien species.

Pollution is another significant problem – industrial pollution accounts for more than half of the volume of water pollution, as water is used to carry diverse kinds of waste, and the most deadly pollutants. A form of pollution is the phenomenon known as nutrient loading, such as nitrogen and phosphorous, which is causing huge impacts on aquatic ecosystems. The increased use of nitrogen poses a serious threat, and is projected to become even more severe in the future, particularly in developing countries. Transforming rivers and extensive water withdrawals also play a profound role. In the 40-year-span from 1960 till the turn of the millennium, reservoir storage capacity quadrupled, and it is estimated that the amount of water stored is around three to six times the amount of water flowing in rivers.

Then there is climate change, widely assumed to become more important as a cause of change in biodiversity across biomes, through changes in temperature, increasing intensity of floods and droughts, and sea level rise. Assessing the impact of climate change on biodiversity is a complex and difficult exercise. The work on developing predictive bioclimatic models have been based on certain assumptions that are problematic, e.g. "that species distribution and assemblages are in a constant steady-state relationship with contemporary climate" (Araújo and Rahbek 2006:1396). Doing away with such assumptions makes it very difficult to predict future species distribution; different models will give rise to widely different projections, and it is difficult to fit past results with future projections. The consensus regarding possible future impacts, however, seems to be that though there may be some positive impacts from climate change, many increase vulnerability as a result of a decreasing supply of ecosystem services (Schröter et al. 2005).

Finally, consideration must be given to situations where there are interactions between two or more of the drivers of biodiversity loss; habitat loss, pollution, species migration and climate change. While the full complexity of social-ecological system may not be modeled, an awareness of the numerous interactions in any particular case where financial mechanisms are to be introduced may be a guide to the kinds of instruments that can be expected to function well.

2. TYPES OF FINANCIAL MECHANISMS

Before we start our enquiry into what it takes to create markets for ecosystem services and biodiversity, we will offer a classification of existing systems. The literature uses different schemes to categorize financial mechanisms for ecosystem services. We have chosen to distinguish between payments for ecosystem services and cap-and-trade systems.

2.1 PAYMENTS FOR ECOSYSTEM SERVICES (PES)

Many authors classify payments for ecosystem services as a market for such services, emphasizing that it is a voluntary trade between a seller and a buyer, (see e.g. Wunder 2005). In practice we observe that public bodies often act as 'buyers' and that the money involved are created on the basis of taxes or fees. In such cases the financial resources used are created using the authority of public bodies. Hence, we find it sensible to distinguish between market-based (MES) and publicly-based payment systems, depending on how the financial basis for the trade is created.

- Markets for ecosystem services (MES)

  This category includes payments where firms or individuals pay landowners – individuals, communities or states – to increase the delivery of ecosystem services. They may take the form of direct trades or trades via intermediaries, NGOs or funds and firms specializing in such transfers. From the 1990s onwards, many countries in the South established so-called Conservation Trust Funds to act as intermediaries in such trades.

  MES based contracts typically define specific actions that the 'seller' is to undertake to fulfill the contract. Certain pieces of land should be left undisturbed; particular practices are prescribed or forbidden. The contract varies depending on the aim and whether it concerns biodiversity, protection of water quality, or carbon sequestration. Karsenty (2007) refers to a specific type of MES – a conservation concession system – being parallel to ordinary forest concessions. In this case, the concession is for protection not for logging. This solution is oriented mainly towards settings in the South where forests are publicly owned, and where the state previously sold concessions to logging companies.

  Finally, we should mention certification systems where certain standards are set for the production of a product – e.g., production standards for timber. In this case, current consumers may be willing to pay a mark-up that reflects the additional costs of following the standard and undertaking the certification. In FSC certification, most of the time, there is no premium or final price differentiation upon timber sales, but it is observable that certified timber is more easily accepted by the market (Ring et al. 2011).

- Publicly based payments

  Publicly based payments take a multitude of forms. One is environmental taxes, where economic actors pay the state for the right to undertake actions that are environmentally harmful. Similarly, public authorities may pay economic actors to deliver increased amounts of ecosystem services – i.e., subsidies. Subsidies may also take the form of tax credits.

  Public subsidies are similar to the environmental payments as defined above. The core difference concerns who actually pays. Subsidies or state payments are financed by various taxes or fees. Hence, environmental taxes may be used to finance subsidies. They may also be based on standard income taxes, production taxes, consumption taxes and ecological value added taxes, etc.

A specific form of state payments or purchase is auctions. The state defines a certain type of service it wants to ensure and creates an auction to facilitate a trade over such values – e.g., Latacz-Lohmann and Schilizzi (2005). Using auctions, the idea is to create a cost-efficient delivery of these services. This system is presently rather experimental and most examples are found in the North.

Finally, a few countries – Brazil, Germany and Portugal – have used ecological fiscal transfers, and they have been suggested as new financial mechanisms for a number of other countries (Ring 2011). This is a system of conditionality where intergovernmental fiscal transfers from the state to lower level public bodies are distributed to allow the latter to provide public goods and services (e.g., concerning school systems, health care etc.). Recent indicators for distributing public revenue include the extent and partly the quality of protected areas in the specific region.

2.2 CAP-AND-TRADE BASED SYSTEMS

Recently there has been an increased emphasis on cap-and-trade based systems. It should be noted that the environmental protection in such a system lies in the cap. The trade is established as a way to reduce the costs that the cap puts on those facing it. Caps are formulated in diverse ways, giving rise to different systems. We will mention three. The first is biodiversity offsets with or without habitat banking. Here development in a certain area is only allowed if money is paid to undertake a restoration of a damaged ecosystem of similar kind elsewhere (Hartig and Drechsler 2009). In principle, the cap is hence the present status of the environment given that the offset is representing an equal enhancement to the loss created by the development. Such a "no net biodiversity loss" cap is 'global', 'status quo' and 'differential' in that no conservation target is specified for specific locations.

A second system is tradable development rights (TDRs). In this system the level of protected areas is defined as a percentage of the land. Developers may circumvent this limit by paying (other) landowners to protect more than this percentage of their land. As with habitat banking, also TDRs are mainly used in developed countries, in particular the USA. TDRs have, however, also been pioneered in Brazil (Karsenty 2007). In contrast to the above, the TDR type cap is 'location specific', 'targeted' and may be 'flat', in that it applies equally to all locations. An example of a cap is present in the Brazilian Forest Code which requires that landowners protect 20% of land in legal reserves, rising to 80% within the Legal Amazon (conversely allowing the landowner to develop 80% and 20% of the land, respectively). Both TDRs and biodiversity offsets require a clearing house mechanism which in the latter is often referred to as a habitat bank. Habitat banking may be seen as an opportunity for developers to offset their impacts.

The third type is the Clean Development Mechanism. It is part of the international climate regime – the Kyoto protocol – where countries with emission reduction commitments according to the protocol – the so-called Annex B countries – were given the right to offset some of their reduction responsibilities against paying developing countries to do the reductions instead. It is a cap-and-trade system in the sense that the Annex B countries have accepted a cap on their emissions. As the developing countries have no such cap, the system is, however, more like a PES system seen from their side.

3. PAYMENTS AND GOVERNANCE

The systems presented above are all governance systems. Historically biodiversity has mainly been protected by establishment of reserves and national parks. While this in some cases may have happened in return for financial compensation – mostly in developed countries – it was based on state command. Using market-based financial mechanisms in biodiversity protection represents a shift in the governance of biodiversity. It implies changes in who are involved in biodiversity protection and in what capacities. This concerns who formulates the goals, how decisions are made, how protection is undertaken and who has to carry the costs. These are all core governance issues.

To look more systematically into this, we start by defining the concept of a governance structure. It comprises actors and institutions, with the following three elements as core:

a) The actors involved – both those with the competence to define common goals and rules (political actors) and those with the right to use the resources given these rules in production and consumption (economic actors)
b) The institutions defining the rules for the political process
c) The institutions defining the rules for the economic process – i.e., rules concerning (i) access to and use of resources and (ii) institutions facilitating the interaction between actors

Political actors do not refer only to governments and parliaments. While ultimate power rests with these bodies, the governance literature also emphasizes the role of communities, businesses and NGOs as part of a wider set of actors engaged in the political process (Lemos and Agrawal 2006). Political actors explicitly formulate common goals for a society. Moving towards markets for ecosystem services, the 'setting of goals' is, however, done by market actors and in an implicit manner. It is the willingness to pay among individual 'buyers' that defines the level and form of protection resulting from their interaction with 'sellers' in a market. Nevertheless, political actors are very important even in this case as they have to define the rights which form the basis from which economic actors make their trade. The rules set for the political process (b) – who can decide about what – are a core aspect of any governance structure.

Rules defining access to resources (c(i)) typically take the form of property rights (e.g., private, state and common property), while institutions for interaction between property holders (c(ii)) could take the form either of market trade, state command or community/network interaction. Problems like loss of biodiversity may follow from the fact that rules are absent or too weak concerning the side-effects of economic activities. Hence, while rights may be defined about access to environmental resources like land, there may be no rules established regarding the use of the common or public goods provided by the land and its ecosystems.

The choice of strategy for protecting biodiversity is fundamentally about defining rights. It is about what rights property owners should have concerning the use of the resources – e.g., the land – they own or have use rights to. It is about what rights those who depend on the public goods aspects linked to that land have regarding the protection of their interests. As any use will

change the capacities and value of an environmental resource, the set of rules defines who is free to shift costs upon whom.[2]

So which rights structure is the better or *most legitimate*? In evaluating the legitimacy of any institutional structure, one may typically distinguish between formal aspects and content. According to the former, a specific institution is seen as legitimate if it is chosen based on a legally accepted process. In other words it is *constitutional*. In terms of content, legitimacy relates to a general standard or ideal about what are right or just processes and outcomes. It is legitimacy of outcomes that is of interest here.[3]

In the case of environmental resources a dominant 'ideal standard' has been the 'polluter pays principle' (PPP). This principle emphasizes that those causing an environmental problem should pay. Human action may, however, also result in increased environmental quality. In relation to that the 'provider gets principle' (PGP) has been formulated. In practice these principles are often confused. The following simple figure may illustrate some of the challenges involved in distinguishing between PPP and PGP.

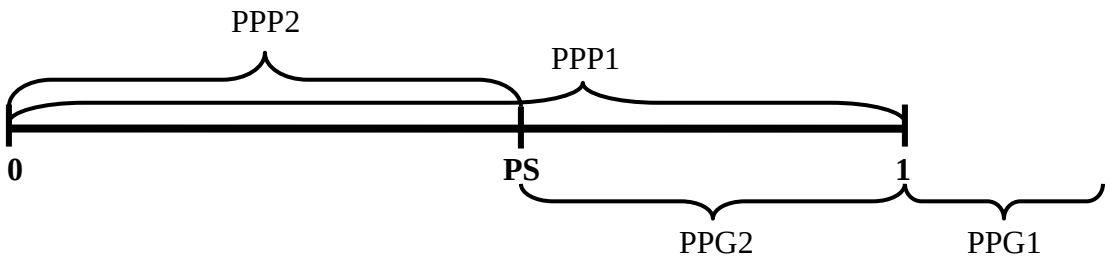

Figure I.2. Rights, compensation principles and environmental status

The line from '0-1' defines the interval between a 'destroyed' environmental resource/ecosystem ('0') and an 'intact' or 'undisturbed' ('1') environment. PS represents the present status indicating some deterioration in the original qualities due to some types of use. This reduced quality is evaluated as positive for the resource users that have moved the system from '1' to PS. They do, however, not consider the effect on others of such a change, as we assume that there are no incentives for them to do so, or no norms restricting use.

So, what are the principles or rights that could apply here? One solution could be that the one who is deteriorating the natural values should be responsible for all damages. This implies that no damage is allowed or that deterioration is accepted, but only against a payment that is set in relation to the damages caused. This rule is illustrated by PPP1. The 'polluter' is responsible for all damages happening in the interval '0-1'.

[2] Note that this goes both ways. If no restrictions are set for use of an environmental resource, costs in the form of negative side-effects will be shifted to those vulnerable to these side-effects. Conversely, if use is restricted, costs are shifted to the land owner.

[3] The literature on legitimate political action is vast. Certainly the work of Weber, Rawls and Habermas is core. Concerning legitimacy and justice in the field of the environment, we refer here to Bernstein (2001), Ikeme (2003) and Bäckstrand (2003).

Another rule is that the 'polluter' has the right to the PS (or in principle any other status between 0-1). If the environment is further, deteriorated, she must pay (i.e., PPP2). If she manages to increase the status, she will be compensated (PGP2). Similarly, in accordance with the PPP1 rule, she will be compensated only if she manages to increase the environmental quality beyond what nature itself has produced ('1') (i.e., PPG1). The latter could be the creation of a cultural landscape or building a dam that reduces disastrous floods. Certainly, such constructions may not only be considered good. It is beyond the aim here to discuss if or when such changes represent net improvements. We only assume that a development of this kind is possible.

Despite the above general principles, the decision over rights cannot be made independent of the cultural or political context in which these decisions appear. Distributional aspects and issues of *fairness/equity*, become typically very important when rules of the above kind are formulated. A simple example from REDD[4] may illustrate this. The idea behind REDD is that the North pays the South to reduce deforestation. This is seen as a cost-efficient way to reduce emissions of CO_2, hence a low cost strategy for the North to respond to its expected post-Kyoto obligations concerning emission cuts. If the PPP1 rule was instituted in this case, the South would have to pay itself for the deforestation. Given that it is countries in the North that have advocated this solution not least to lower own costs for reducing climate gas emissions (offset solution) compensation (PGP2) seems to be the more legitimate solution. Note also the added argument that the North already has cut its forests substantially as part of its development strategy and that many communities in the South depend on forests for their livelihoods.[5]

What then if the deforestation is produced by multi-national companies with owners in the North? Should these be compensated for lost access to forests in the South by asking somebody to pay them? In this case compensation (PGP2) would maybe not be as obvious. Certainly, one may again evaluate this differently if the companies have legal contracts which may make them entitled to compensation or if the 'contract' is illegal. There are many issues of this kind related to defining rules. A further discussion of relevant issues is found in Text boxes I.1 and I.2.

Legitimacy does not only concern the definition of rights. It also concerns issues like accountability, transparency, and distribution of power. Governance structures 'score' differently on these dimensions. If emphasis is on accountability and democratic decision making, more emphasis will be put on political processes and less on the market. If political processes are corrupted, this conclusion may be reversed.

From this we see that what can be considered a legitimate set of rules depends on the wider social and political contexts. No single solution can be proposed that works across all settings. At the same time, not recognizing that the above issues are at the core of choosing governance and hence payment structures is erroneous. As will be clarified later, these questions are typically not very visible in the present debate over 'new' or 'innovative' financial mechanisms.

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[4] Reduced Emissions from Deforestation and forest Degradation

[5] Note also that there is no way states in the North could obtain REDD in the South without paying/offering some kind of compensation. They have no power to define PPP1 as the rule for a country in the South. This is certainly a different story within a country as it has the legitimate power to establish whether PPP or PGP should rule. While this issue is important, the point in the text is about what can be defended as a good principle and not about who has the power to do what.

TEXT BOX I.1. Setting the standard – defining the right

As mentioned in the text, PS could in principle refer to any level between 0 and 1 in Figure 1. While in practice, PS as present status seems to play a central role in defining where PPP stops and PGP starts, there are at least two 'deviations' that need to be mentioned. Standards may be set above PS, meaning that the land owner has the duty to keep the land – typically forests – at a certain status. Such duties are often legally defined, but we also find them as parts of in certification systems.

Next, ecosystems qualities are no fixed entity. Changes in land use (PS) over time, and uncertainty about what a reference status of biodiversity constitutes (1), are principle problems in determining rights. Information about PS and 1, and technologies to mitigate pollution or provide services, also modify rights that may be legally well established, with consequences for the effectiveness of instruments. For example, even when a clearly defined biodiversity conservation target is politically accepted (for example the 'no net loss' principle implied by the EUs 2020 target of 'halting biodiversity loss') and polluter pays principles established (for example the 'mitigation hierarchy' of the EU Environmental Liabilities directive), lacking knowledge about the baseline environment before pollution, and lacking mitigation options after pollution, mean that a polluter pays principle (PPP2) moves below PS. For example, the effectiveness of biodiversity-offsets in a habitat banking scheme depends not only on its legally established 'cap', but also on the extent to which the 'mitigation hierarchy' is technically feasible and how much 'residual biodiversity impact' relative to a reference level remains to be traded with an off-site location, after all mitigation options have been tried on-site.

As a broad hypothesis, the greater uncertainty about reference levels and options, the more PPP gives way to PGP in conservation policy-making.

There are two more important issues concerning the choice of governance structures for biodiversity protection. These are more technical and concern the effectiveness and efficiency of various solutions. *Effectiveness* concerns the capacity of the structure to deliver a reduction in the loss of biodiversity. There are several issues to consider. First, one needs to evaluate how well the governance structure fits the type of good or service involved. When are e.g., markets capable of handling the necessary information well and when are they not? When can a service be easily demarcated, priced and treated as a commodity? Second, what is the capacity of the governance structure to raise the necessary resources? Third, how does the governance structure set up motivate actors to deliver increased protection of biodiversity? As part of this, how well is the structure at ensuring additionality and permanence? Biodiversity loss has certainly a long time horizon and taking action where action would anyway happen should not have priority.

Efficiency concerns the ability to deliver cost-efficient biodiversity protection. This involves both the direct cost of e.g., reduced deforestation and the transaction costs related to the chosen governance structure. Different governance systems have different ability to find cost-effective solutions. Transaction costs are also different if we compare the taxing power of a state with a more market oriented solution.

In the following we will discuss the above issues in more detail. We will start with looking at how to define the service, its value and boundaries.

TEXT BOX I.2. Rights in landscapes

Figure 1 illustrates the general rights structures that can be applied in relation to environmental services. In actual landscapes, land qualities will range from the almost completely disturbed (urban) (0 in Figure 1) to the undisturbed (wilderness) (1 in Figure 1). Moreover, we have varying information about and mitigation options for these locations. Therefore, countries have, through trial and error, adapted their policy mix to polluter pays and provider gets principles simultaneously, but differentially across different land use types. Figure 2 suggests how both PPP and PGP can exist side by side, through complementary conservation instruments because of heterogeneity in landscape characteristics/biodiversity and economic land uses/opportunity costs. In the stylised figure which is inspired by forest and environmental liability legislation in Costa Rica, a blanket ban on land use change is in force for all forests, at the same time as public protected areas form the backbone of the country's conservation strategy. Landowners are environmentally liable for damage caused to forests (PPP), while in the same landscape different PES mechanisms target different combinations of land uses with different opportunity costs (PGP). Compensation is paid for areas expropriated for national parks while PES targets land in buffer zones that is either less biologically unique and/or more costly to expropriate (both due to opportunity costs and in terms of political legitimacy).

Spatial differentiation of market-based and regulation based conservation mechanisms is costly to design and apply 'from scratch'. Costs of information about reference levels, variation in land use characteristics, and conservation effectiveness, mean that policy instruments are often developed incrementally and experimentally over time.

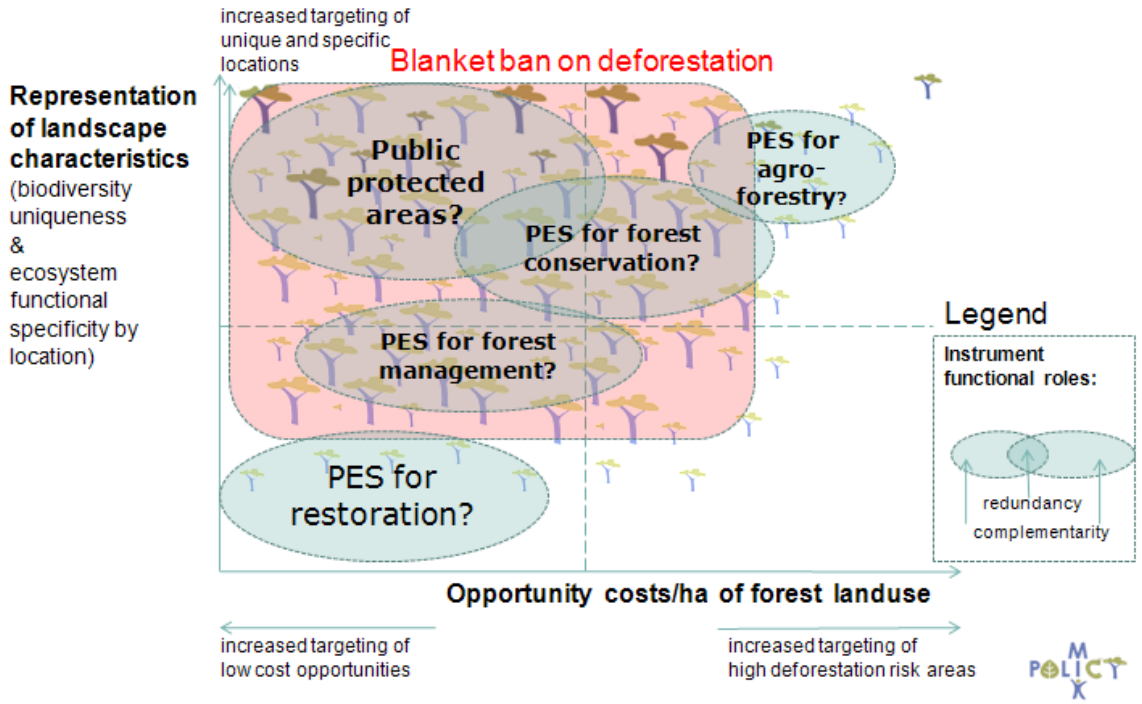

Figure 2. A 'Policyscape' for biodiversity conservation instruments.

A conceptual illustration of a PES scheme (provider gets principle) complementing a blanket ban on deforestation and public protected areas (polluter pays principle) within a landscape. A mix of principles and instruments is needed to tackle the variation of biodiversity characteristics of the landscape and opportunity costs of conservation land use (symbolised by the variation in tree type and cover across state space in the figure).

4. DEFINING AND VALUING SERVICES FROM BIODIVERSITY

As already emphasized in Section 1, biodiversity exhibits a high level of complexity. This is also captured in the definition included in the Convention on Biological Diversity, which states in Article 2: "'Biological diversity' means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems" (UN 1992).

Historically, we observe a move from seeing biodiversity foremost as variations in species richness to see it more as a systems feature. Concerning the latter, it is the structural and functional relationships between species that are emphasized, seeing species as integrated in webs of matter and energy cycles reproducing the systems. This development is also found when looking at history of biodiversity protection with a shift from species to ecosystems (Meffe and Carol 1997).

The concept of ecosystem services is developed from this latter perspective. This notion has gained momentum in the last 10-15 years as part of an extended argument for why biodiversity should be protected (Daily 1997; MEA 2005). The Millennium Ecosystem Assessment distinguishes between four sets of services:

- Provisioning (e.g., food, fresh water, wood and fibers, fuel)
- Regulating (e.g., climate regulation, flood regulation, disease regulation, water purification)
- Cultural (e.g., aesthetic, spiritual, educational, recreational)
- Supporting (e.g., nutrient cycling, soil formation, primary production)

While the above services have a strong physical and chemical dimension, it is the biological dynamics that give them their distinctiveness and provides for much of their functioning.

Introducing the concept of a service has also been part of a move towards seeing biodiversity as a product whose qualities have great implications for human living conditions. In relation to this we note that the Convention emphasizes both conservation and sustainable use. Actually, there is a continuum from full protection via managed systems to sustainable use. Ensuring human livelihoods often implies that the latter is of great importance. In this report we make no emphasis on the various types of protection as the general principles discussed in this report apply to all types. Text Box I.3 offers a brief discussion of this.

The service concept has influenced the way we think about environmental protection. A service is something we are used to pay for. If there is too little biodiversity it is because we do not pay (enough) for the services involved (Daily 1997; Daily et al. 2000). Certainly, from the discussions in Section 3 above, one could equally claim that it happens because those destroying them do not pay for the associated costs. The reports from the Millennium Ecosystem Assessment establish a conceptual model where human needs are satisfied by ecosystem services which are derived from ecosystem function which in turn are dependent on biodiversity. TEEB (2010) extends this cascade model to distinguish between benefits derived from ecosystem services that meet human needs, and the (monetary) value of those benefits.

TEXT BOX I.3. Biodiversity protection and sustainable use

The CBD rests on three pillars, namely biodiversity protection, sustainable use, and the equitable access and sharing of benefits from genetic resources. There is no principal difference between the mechanisms discussed in this report concerning their applicability to biodiversity protection as compared to sustainable use. For instance, payment for environmental services could reasonably accommodate the opportunity of existing rights-holders of continued non-consumptive and consumptive use, as long as that use remains within the limits of what is considered a sustainable threshold. However, as the section on effectiveness of environmental services (cf. part II) demonstrates, it is intrinsically difficult to determine the effectiveness of PES schemes in terms of the nature of ecosystem service delivery, and thus also to determine the relationship of sustainable use and service quality. It might not be feasible, or even advisable, to try to categorize the different payment mechanisms according to whether they are supposed to serve the goal of environmental protection, or sustainable use. Generically, one could argue that the transaction cost related to protection would be less than the costs of sustainable use, as the latter would necessarily involve some form of long-term monitoring. What is most appropriate is a 'policy mix' that is geared to the particular contexts of each setting.

The CBD guidelines on sustainable use – the Addis Ababa guidelines (2004) – state that what is perceived to be sustainable will vary according to the type of biodiversity, the conditions, and the institutional and cultural context in which use takes place. The underlying premise of 'sustainable use' is that it is possible to use 'biodiversity components in a manner in which ecological processes, species, and genetic variability remain above thresholds needed for long-term viability' (ibid: 2). Using mechanisms to encourage sustainable use underscores the need to develop indicator frameworks that are comprehensive, and needs to deal with issues of fluctuation and multiple equilibria (cf. Appendix). Note also that many programs geared at protection involve management – implying similar needs. Similarly, offset programs demand monitoring both of the on-site and off-site areas.

Sustainability is a very contested term, and there is a huge literature on the subject which deals with what 'sustainability' – hence, sustainable use – means in terms of natural resource management and ecosystem governance more generally (see e.g. Leach, Bloom et al. 2007). However, the scope of this report does not allow a detailed discussion of the concept. The guidelines also highlight the need to recognize local stewardship rights, arguing that when people's rights of access are secure, the incentive to over-exploit resources will be removed

It should be noted that this shift in perspectives has also spurred negative reactions. MEA has been criticized for its simplistic view of the correlation between biodiversity and ecosystem services, citing a body of research which shows the relationship to be ambiguous in a number of particular, but not trivial cases (Naeem *et al.*, 2009). Sharman (2010) notes that by emphasizing the service aspect, a change in focus towards a utilitarian mode of thinking is made, and this comes at "the detriment of the idea that humans have a responsibility for nature irrespective of its notional value to humans" (p. 2). Hence, some have now started to talk about biodiversity *as opposed to* ecosystem services.[6] Spash (2009; 2011) sees the development as driven not least by a belief among conservationists that emphasizing the service dimension and the implicit mone-

[6] This was, as an example, very visible at the ALTER-Net Conference on Ecosystem Services and Biodiversity, held in Vienna, November 2010

tary value will increase the power of the argument for biodiversity protection as 'money speaks strongly'. He sees it as a pragmatic move. Both Sharman and Spash emphasize that it is the strength of the interests and developments going against biodiversity protection that causes the problems, rather than the form of the argument.

TEXT BOX I.4. Ecosystem services in Norwegian biodiversity protection

Reticence to basing conservation policy objectives solely on the concept of ecosystem services can be seen in new legislation such as Norway's 2009 Nature Diversity Act, which establishes objectives and means for Norway's conservation policy (Barton et al. 2011). A government White Paper (Miljøverndepartementet 2009) discusses comments to the hearing process from stakeholders who called for the inclusion of ecosystem services as an objective of the Act. The White Paper justified not including provision of ecosystem services among the objectives amongst others because "which ecosystem services [are important] will vary according to the specific quality and type of nature and humans' needs" ; that it would be "more clarifying [than cite ecosystem services] to mention the dependency humans have on nature as it constitutes the basis for activity, culture, health and wellbeing"; and that "if biological, landscape and geological diversity and ecological processes are maintained, then nature will supply ecosystem services to humans"(translation by the authors). The Act has among its first objectives to conserve these types of diversity. The White Paper states, however, that ecosystem services can be "a useful concept in interpreting the law and promoting awareness about the values of biodiversity for humans, and who provides and benefits from services" (translation by the authors)

Framing the issue in service terms has pushed the question of what they are worth in monetary terms. Looking into this, we note that it may not be necessary to do monetary valuation even though one intends to use payments. One can equally well define a level of protection based on other criteria. In the case of market solutions, however, monetary valuations will be important. Those buying the service(s) must make up their mind about what it is worth in monetary terms – i.e., what they are willing to pay.

There is substantial disagreement in the literature about monetary valuation of environmental amenities or services. This concerns a series of issues like whether the different values related to environmental goods and services can be sensibly measured by one common scale like money. Authors emphasize the plurality of value dimensions that cannot easily be reduced to one dimension – e.g., ethical issues and aspects related to nature and peoples' identity (cf. the arguments by Sharman above). Different types of information problems are also core examples of problems related to monetary valuation. Given the complexity of biodiversity, one may question whether individuals asked to pay or offer a price actually have the necessary knowledge to make an informed choice. Using markets to value the good may imply putting trust in consumers having very little insights in what the factual issues are. Questions are also raised concerning the problem of delimiting the good or service – to make it a tradable item. As we have seen, biodiversity is a complex system feature. As such it is very difficult to define and demarcate what

the 'commodity' to be paid for really is.[7] Hence, the service could be whatever the individual thinks it could be. Spash (2011) notes that they then do not have much content. For a more in depth analysis of these issues, see Daily et al. (2000); O'Neill (2008); Vatn and Bromley (1994); Vatn (2009).

As noted, when using markets for ecosystem services, monetary valuation will form the basis for the demand. Hence, the above problems will all be relevant. When issuing state taxes or publicly defined payments ('subsidies'), the goals defined concerning reductions in biodiversity losses or delivery of specific services need not to be established on the basis of monetary valuations. Political bodies – if they demand decision support – can make the decisions based on inputs from a variety of methods or procedures – e.g., monetary assessments, expert advice/environmental impact assessments, multi-criteria analyses, deliberative methods (see Munda (2007); Vatn (2005; 2009); Wittmer et al. (2006) for discussions of these methods).

A challenge for all these methods concerns the problems of identification of biodiversity and the cognitive burdens of evaluating complex alternatives. Deliberative methods like citizens' juries and consensus conferences respond to these challenges by combining the competencies of lay people and experts. Lay people are considered competent on the value issues, while experts have technical expertise and factual knowledge. Through in-depth communication lay people develop proposals concerning what is the better choice or goal for e.g. biodiversity protection, while experts support this process through presenting what the knowledge frontier looks like and what seems to be the main uncertainties involved (e.g., Renn et al. 1995). Deliberative methods, do not eliminate the cognitive burdens of assessing biological diversity, but may help expose decision-making problems that come from lacking information, instead of hiding them behind a seemingly exact monetary estimate.

In relation to the above, one should also note that while monetary valuations are based on individual preferences of economic actors, deliberative methods emphasize the role of the citizen. The argument behind the economic model is 'consumer sovereignty'. Consumers should be free to choose and nobody should have the right to question the preferences underlying these choices. In the deliberative model, this is differently understood. In the case of common goods like biodiversity, one individual's preferences will by definition influence other peoples' opportunities. Hence, the sovereignty of individual preferences is challenged. Instead, it is maintained that it is the soundness of various preferences and arguments that should is important, implying that deliberation and not the summing of individual payment bids is the better process to define which ecosystem services to protect or produce.

Finally, there is also the argument that the main issue concerning ecosystem services like those flowing from biodiversity, are the future risks and uncertainties involved. It is about securing the integrity of ecosystems and hence avoiding stepping beyond certain bounds where their functioning is destroyed or shifted. When this is the case, the issue is more about defining limits such that important thresholds are not exceeded. Identifying such thresholds would demand processes of a kind that are different from that of economic valuation of incremental changes in

[7] We recognize that at the COP in Nagoya there were discussions about market-instruments and the implicated commodification of nature. This is a discussion which also is emphasized in the academic literature. The issues concern the problem of perceiving environmental goods as items that can be traded.

environmental quality. It is typically an issue for experts, although the complexity of biodiversity impact assessment may also exceed combined expert knowledge (cf. the discussion in Text Box I.3 on sustainable use).

To ensure that the desired level of biodiversity protection is realized, one also needs to know the costs of changed use. In the case of market trades the idea is that these costs will reveal themselves as part of negotiating the deal. The seller will only accept payments that cover all the costs that s/he encounters. In the case of public payments – whether taxes or subsidies – these costs have to be established by the public authority in order to define what level of taxes/subsidies is needed to realize the goals. The costs will concern 'lost opportunities' – hence, they are called opportunity costs. They include lost income from selling goods and services from ecosystems like timber, non-timber forest products, food, energy services or land for infrastructure, housing etc. Certainly, livelihoods may also produce goods that are not traded – e.g., firewood and food for own consumption. Nevertheless, the opportunity costs for the people involved can be estimated on the basis of what it costs to buy equivalent amounts of these goods in local markets. Having said this, one should note that livelihoods for people may not be just 'income'. Issues like identity may be linked to the type of consumption or production practices involved. In such situations defining the necessary payments may be demanding. In some situations payments may even be seen as unacceptable by local communities.

One issue is common to both pricing and costing. That concerns the definition of the service. To value, pay or tax demand to demarcate what is to be valued, paid for or taxed. This is demanding given the fact that the service in many instances is a complexity of processes. In the case of ordinary commodities like milk, nails or gasoline, qualities and volumes are standardized and fairly easy to measure. In the case of services such as day care, haircuts and travelling, defining them is more demanding. Again, however, different standardizing procedures have been developed to make transactions possible. Some ecosystem services come close to 'ordinary commodities' – e.g. wildlife experiences/safaris. Other services, such as the regulating and supporting services as defined by MEA (2005), are much more difficult to define and delimit. Precise demarcation and definition is either very costly or impossible. In such cases, the only way open is through defining proxies. Such proxies could be land of a certain type or specified practices for certain land use classes. While the service cannot be accurately measured, these features are observable and through research one can establish relationships between protecting certain types of land cover, demanding certain practices and the degree of biodiversity protection that follows. Certainly, using proxies opens up for various opportunities to cheat that need to be acknowledged when establishing governance systems.

5. CREATING FINANCIAL RESOURCES

Financial resources for the protection of biodiversity and the attached services are created by defining rights and responsibilities. The state can define rights to be with the polluters/providers or by the victims/beneficiaries of the (dis-)service. From that basis the state can issue taxes (polluter pays principle – PPP) or subsidies (provider gets principle – PGP) to facilitate enhancement of biodiversity. Given that rights are defined, markets can also be created where

those destroying biodiversity make contracts with rights holders and pay compensation (PPP) or providers of enhanced biodiversity are themselves paid (PGP).

In the case of environmental taxes, the tax serves as an incentive to take better care of the ecosystem service. As it becomes costly to diminish environmental qualities, less damage will happen. While this is emphasized as the main *raison d'être* for environmental taxes, income from such sources could also be used to finance further environmental protection activities or compensate victims for the environmental damage caused by the activities that are taxed. Economists dominantly argue that such 'earmarking' should be avoided, as it reduces efficiency. On the other hand, there is quite strong evidence that the acceptance among people for environmental taxes increases if the money is earmarked to finance environmental action (Kallbekken and Sælen 2011). This latter observation is not unimportant as the general acceptance of increased taxes among the public is rather weak and puts some important limitations on using taxes as a way to solve environmental problems

Subsidies are based on the opposite rights structure (PGP). Here economic actors are paid by the state for delivery of ecosystem services/avoiding certain activities that are environmentally detrimental. While subsidies may be politically easier to institute than taxes – the carrot vs. stick analogy – there are issues also here. Economists point out that subsidies may create the wrong incentive and result in too many firms being attracted to a sector. Moreover, to be able to pay, the state needs to raise the necessary funding. This may happen through a variety of ways as indicated in Section 2.1 – involving again what is considered acceptable general tax levels.

Defining rights in the case of environmental harm may be demanding. As shown in Section 1, it is often difficult to define who exactly causes the loss of biodiversity. The causal chain is long. We see this is typical when the loss is due to pollution or to land fragmentation. In the first case, the causes are often mixed and sources may be far away, even in other countries or continents. Hence, it is difficult to claim that a certain economic activity is (among) the cause(s). Next, the country which experiences the losses may not have the power to define obligations for the source(s) as it lies outside of its jurisdiction. In the case of fragmentation, the effect is following from a sum of independent, often small acts where each single action has a non-measurable impact on biodiversity. Who is responsible then?

While the above arguments put restrictions on any payment system, it is especially problematic for markets, as rights need to be very clear for any trade to happen. Looking into this, we should first note that according to the so-called Coase theorem (Coase 1960), it does not matter who has the right – the polluter/developer or the victim. Assuming that the costs of transacting are zero[8], the level of environmental protection will be the same. What matters is who is willing to pay the most; whether the firm is willing to pay more for building in a wetland area, or demand higher compensation for not doing so, than the 'victims' are willing to pay.[9]

[8] This assumption is not very realistic, however. It will be discussed in Section 6.

[9] There are several issues at stake here not considered in the famous paper by Coase. One concerns the effect of the monetary transfer itself. If rights are with the local inhabitants and they are more environmentally friendly than the firm, giving the right to them will result in further environmental gain as they will to a larger extent use the compensation on environmental issues. Another concerns the huge difference observed between willingness to pay (rights with the polluter) and willingness to accept compensation (rights with the victims). According to Horowitz and

For most ecosystem services trades – not least for those emanating from biodiversity – establishing clear rights and undertaking the necessary controls for delivery clearly involves very high costs of monitoring, impact modeling and enforcement. The zero transaction cost assumption of the Coase theorem, which underpins the rationale for self-interested trade between an ecosystem service beneficiary and provider, makes the theorem of limited relevance to biodiversity conservation. The observation that many different state-promoted PES systems exists gives testimony to this argument. This is the reason why most markets are found in situations where local effects are dominating. Here causal chains are acceptably simple. We will make a more thorough analysis of this in Part II.

There is one exception to the above. Voluntary payments do not demand any prior definition of rights. In this case one party is voluntarily taking on the responsibility to pay. Individuals and firms may be willing to pay for biodiversity loss because they want to support a good or important cause without necessarily expecting any return. While individuals may do this as they find biodiversity protection very important, firms may do it as part of their corporate social responsibility strategy and/or to create a positive image that may pay-off in increased sales of their products. We will return to this in Section 7 on motivation.

In the case of biodiversity protection in the South, many countries lack financial resources to compensate local communities. As these are often dependent on land conversion for their livelihoods, forcing protection without compensation may seem unethical. Moreover, it is often Northern interests that favor protection. Hence, payments from North to South are needed both due to ethical considerations and because of sovereignty issues. Protection has to happen outside the jurisdiction of those opting for it. While this situation limits whether PPP or PGP is to be applied – actually PGP is the only relevant option – it does not change the problems related to create the necessary financing as discussed above. To the extent firms from developed countries want to establish in a developing country, the latter could have the option to demand payments to e.g., biodiversity protection as a condition for establishing. Whether this would be in the interest of that country is a different story.

6. SYSTEMS FOR FINANCIAL TRANSFERS

Paying money also demands a system for financial transfers. In the case of public taxes and subsidies, the state or local authorities need to identify who should be taxed or paid. Next, the level of payment has to be decided and money transferred. In that sense the state (or local authority) could be seen as an intermediary between tax payers and receivers. The power of the state is used to issue taxes. This implies that payments to the state are not voluntary, while payments from the state – subsidies – more typically are.

In the case of using markets, buyers and sellers need to find each other. While who is a buyer and who is a seller is defined by rights, whether there will be a trade depends on how easy it is for the parties to locate partners for a trade and agree on a price. In some cases buyers and sellers

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McConnell (2002), these figures are in the order of 1:3. Due to this difference, who has the right could substantially influence the level of protection.

are few. This may be the case for localized issues and direct trades may be possible. More typically for the services of ecosystems spread across a landscape the situation will be characterized by many providers and very high numbers of potential victims/beneficiaries. Therefore trading may be quite demanding to facilitate. Transaction costs[10] are typically (very) high, and markets do not 'just pop up'.

It is also observed – especially in the South – that receivers are not easy to define. Property rights may be unclear, land held in common, and it may be necessary to set up new systems for making local people able to receive and distribute payments. Certainly, the power games this may create warrant specific attention. This is the case whether pubic systems or markets are used.

Due to the high transaction costs various intermediaries may operate between sellers and buyers to reduce these costs. If an individual or firm wants to devote resources to biodiversity protection, they will soon realize how costly it is to search for projects to support. They would rather prefer an intermediary that is specializing in financing such projects. It is, however, here that the power of states and other public bodies as 'intermediaries' is most clear. Adding a biodiversity tax to an already existing tax is technically very easy and demands few resources. Creating money in markets is more demanding.

Due to all the uncertainties and control problems involved in the case of ecosystem services provision, well functioning payment systems demand cooperative parties. Without a cooperative will, there are too many ways that a deal can be circumvented and partners be cheated. To establish such an environment, taking the wider institutional context into which payments are introduced is very important (Muradian et al. 2008). This concerns both rights to land, community organization and which local norms and rules exist concerning use of natural resources.

As previously emphasized, payments from North to South may be both necessary and important. In this case specific issues appear concerning how to pay local people or communities. They may not have clarified rights to the resources involved. Hence, before any payment can take place – whether public or through markets – a process of defining such rights is often needed. This may be quite a demanding process as we already observe in the case of establishing REDD.

7. MOTIVATIONAL ASPECTS

The final aspect of financing biodiversity protection that we will look into, concerns the motivation of involved actors. This is a field where there is quite some controversy in the literature. Standard economic theory assumes behavior to be motivated by individual utility maximization, or profit maximization in the case of firms. In the public choice literature, this understanding of behavior is even expanded to the area of politics and public administrations. Politicians as well as administrators are motivated only by what personal gains a policy represents.

[10] Transaction costs are defined as costs of gathering information, making contracts and controlling that what is contracted is also delivered. While the concept is related to market interactions, it has also become standard to use this concept for costs of interaction in all types of governance structures – e.g., the interaction between public authorities and market actors..

In the more institutionally oriented literature, the perspective is quite different. Here there is emphasis on the existence of different types of motivations. They vary between institutional contexts (e.g., Hodgson 2007). So, not only transaction costs, but also motivations vary between governance structures. While markets are seen to emphasize own interests, action within a community of people is driven more by what is seen as appropriate. In the case of political action March and Olsen (1995) emphasize that governance takes place not least by the creation of what is appropriate through forming the identities of public officials. Certainly, ensuring that norms and rules for public officials are in place and followed is no simple task, but it is available for social construction and reconstruction.

The importance of this for the governance of biodiversity, relates to the way the choice of financial mechanisms may influence the way actors operate. Several questions are of importance. First of all, we may ask how the choice of governance structure influences the level of available financial resources for biodiversity protection. More specifically; what facilitates voluntary payments? Equally important; how do governance structures influence actors' willingness to play by the rules? Since it is very difficult to control that all the money invested is used for the intended purpose, it is important to create a situation where the aims of biodiversity protection are internalized among actors. Corrupted practices and perverted incentives are general problems haunting both public administrations and markets.

The distinction between payments as incentives and as compensation is important in relation to the above. In the case of an incentive, the issue is about varying the payment according to the level of delivery; the payment is the motivation. In the case of a compensation – as the concept is used here – it is more about what is a fair reward for acting responsibly. Hence, we may distinguish between a pure 'seller–buyer' relationship and that of a compensation where the logic is to compensate for costs related to service provision beyond what an actor could be expected to do on his or her own. In the incentive case, the focus is on payments per unit of delivery. As the latter is hard to define, it may be easy for providers to undercut the buyer by providing less than the contracted improvement. In the case of e.g., habitat banking there is typically a lot of possibilities for a flexible definition of the quality of the substitute. Again we observe the effects of the complexity of the goods involved and the space it offers both for the intermediaries and for those producing the service to choose 'simple solutions'. If their aim is to keep costs as low as possible, it is expected that this space will be utilized. If the focus is, however, on how to induce appropriate behavior with an accompanied compensation, the idea is that by internalizing an appropriate way of treating biodiversity, the level of corruption and perverse behavior will be reduced. People seem to trust voluntary organizations/NGOs more than corporate intermediaries when paying for 'good causes' – for the reason that NGOs are mostly non-profit organizations, and hence are motivated by the cause of protecting biodiversity, rather than by monetary incentives.

Spash (2011) points towards another aspect of this. In the case of e.g., habitat banking this is now being presented as a new opportunity for banks and other financial institutions to grow. According to Munden (2011) they will moreover be in a position to seize a dominant fraction of the payments. While Munden's analysis is focused on the carbon market, we envision that the challenges may be even greater in the area of biodiversity protection as biodiversity is more

demanding to measure than carbon. An argument for the opposite is that markets for biodiversity off-sets will at least initially be at a state/national level

The existence of voluntary payments for ecosystem services represents a puzzle. Such payments from firms could – as already indicated – be explained by the fact that it may increase their standing among consumers. What seems at first glance to be costly for the firm may hence in the end increase profits as sales go up. Nevertheless, doesn't corporate social responsibility mean anything beyond being a more 'sophisticated' way to earn more money? And next, how do we explain that consumers are willing to buy more from firms that support environmental projects? They gain nothing themselves from doing so – the 1/n problem[11]. The existence of such acts rather supports the idea that people do not only behave in ways that maximize their own utility. This is a positive message for those that want to protect biodiversity. The negative message is that it might be demanding to make a voluntary market of any size.

We should finally note that there is a fundamental motivational problem inherent in payments for ecosystem services. Payments to stop destroying biodiversity could motivate people to (threaten to) ruin it. Hence, the method works against its own aim. This kind of perversion is already observed in the case of REDD. Certainly, countries with high levels of biodiversity could ask why they are not compensated for keeping it, while those having already ruined it are paid to reduce the speed of destruction or to restore it.

8. CONCLUSION

The basis for creating financial resources to protect biodiversity lies fundamentally in the definition of the rights. Setting these up is no simple issue due to the complexities involved both concerning the type of goods/services involved and the type of existing rights concerning use of environmental resources. There are many interests that oppose the creation of rights that favor biodiversity protection. This is so independently of whether we look at markets or at public governance structures.

Both the general belief in the superiority of markets as creating efficient allocation of resources and the increased pressure on the public tax system, have pushed in the direction of more use of markets in the area of biodiversity protection. This is observed all the way from the very creation of the concept of ecosystem services to experimentation with various market mechanisms. What has been little understood is what it takes to design markets and what core role the state has to play in that process.

Our analyses have shown that there are many obstacles to a successful use of markets for biodiversity. This concerns the kind of values involved and the limitations of markets in capturing

[11] The 1/n problem refers to the fact that the individual is not alone influencing the problem. If one person pays, it will not have any (much) effect. Success demands that all (n) or at least that most people pay. This structure makes it 'irrational' for the individual to pay.

these. It concerns the problem of delimiting the services. It concerns the level of transaction costs involved and the various motivational perversions that payment systems are vulnerable to.

Some of these problems are also relevant if we look at public governance systems and public payments. Delimiting the goods is equally difficult. Motivational perversions are also a great challenge here. Public systems have, however, wider options available concerning evaluating the values involved. They have also some advantage concerning transaction costs. Using state power to tax citizens or firms simplifies the generation of financial resources. Only rather bureaucratic or corrupt systems seem unable to deliver this advantage. Finally, public systems should have the capacity to overcome some of the piece-meal strategies that by necessity will characterize markets.

Certainly, bad public governance is often observed, and comparing 'idealized' markets and public systems may offer wrong conclusions. Hence, we will do further analyses in Part II and III based on more in-depth studies of actual experiences with PES, habitat banking etc. Before we do so, we want to emphasize one challenge that is demanding for both markets and public payment systems. This concerns the overall development path of our economies and what that implies for biodiversity protection.

Payments – whether via markets or public systems – are able to correct resource allocations at the margin. They are, however, weak when it comes to directing the economic development path. Observing that economic growth has demanded increase in the use of natural resources (Jackson 2009), the question arises: Can the growth process go on continuously, or is it necessary to also think about how economies could become less dependent on growth? What kind of changes in the governance structures would that demand? This is an issue of increasing importance for rich countries, not least to create the necessary space for poor countries to catch up. This concerns also how many risks we are willing to take. While searching for solutions in the form of payments may offer some relief, it seems only to be part of the solution.

Part II:

EXPERIENCES WITH NEW FINANCIAL MECHANISMS

AN ANALYSIS WITH MAIN FOCUS ON PAYMENTS FOR ECOSYSTEM SERVICES

by

Arild Vatn and Synne Movik

The experience with new financial mechanisms for ecosystem services/biodiversity is quite variable. Some are just experimental. Others are used in a few countries only. Payments for ecosystem services (PES) is a system for which there is now quite some experience. The aim of this part is, hence, to give an overview of the insights that have developed concerning the functioning of such a mechanism. Looking at PES, we will also include a brief analysis of so-called Conservation Trust Funds (CTFs) – a specific type of intermediary that has been established in order to facilitate PES. Finally, we will compare PES with a few experiences concerning the Clean Development Mechanism (CDM). While being a climate mitigation mechanism, we find that it can expand our insights about the effects of various types of governance structures for financing delivery of ecosystem services/protection of nature.

The three governance structures covered in this part of the report are important also because they provide experience from developing countries. The mechanisms discussed in Part III – e.g., habitat banking; contract auctions – are so far dominantly used in developing countries. Certainly, we note that also PES systems are more extensively used in developed countries. Nevertheless, they also play a significant role in the South. CTFs are to a large extent established in the South. In the case of CDM, we note that it was specifically created to operate in a developing country context.

1. DEFINING CRITERIA

Analyzing mechanisms like PES demands defining a set of criteria to be used. In the literature on the evaluation of policy instruments it has become quite standard to refer to the so-called 3E criteria – effectiveness, efficiency and equity – e.g. Angelsen (2008). While covering important aspects, they are all focused on consequences. We find it advantageous to also incorporate the wider issue of legitimacy, including the processes of decision making.

Bäckstrand (2006) distinguishes between *input and output legitimacy*.[12] Input legitimacy refers to the procedures by which decisions are made, including issues such as representation, distribution of power, accountability and transparency. Concerning output legitimacy, emphasis is on consequences. Bäckstrand focuses only on effectiveness, while we find it helpful to extend an evaluation of consequences to include equity and efficiency as well – i.e., the 3Es.

In the scholarly debate on legitimacy, much importance is attached to the related concept of justice. Before we specify the content of our criteria, we find it judicious to give a brief introduction to that debate. The literature on justice distinguishes between *procedural and distributive* justice. The former relates to the fairness of the process. The latter concept is quite parallel to that of equity. While the above distinction again seems to be dividing issues according to process and outcomes/consequences, the literature is quite complex concerning the meaning of what is a just process and a just distribution respectively. Looking first at procedural justice, Rawls (1971) makes a distinction between 'perfect' and 'pure' procedural justice.[13] A process of the former kind is legitimated by the fact that it produces the outcomes sought. Hence, emphasis is implicitly at consequences. From this perspective markets could be favored if the preferred outcome is e.g., efficiency. The concept of procedural justice is focusing purely on characteristics of the process. So, if emphasis is on democracy for its own sake, the logic follows that of 'pure procedural justice'.

Concerning distributive justice, there is a wide range of ways in which this concept is understood. Focus may be on equality in the distribution of income. Others emphasize equality in access to resources or in opportunities. Some emphasize justice meaning distribution based on needs. There is also emphasis on the least advantaged.[14] In our analysis we will concentrate on income and rights structure. We will put special emphasis on consequences for the poor.

Based on the above, we have chosen to use legitimacy as the overall criterion, distinguishing between legitimacy of the process (input legitimacy) and legitimacy of outcomes (output legitimacy). The latter includes the 3Es. Each criterion is more specifically defined below. All criteria have clear normative content. While the selection of criteria and sub-criteria is strongly normative, the analysis is itself will be descriptive. The aim is to describe the various systems and the experiences obtained with respect to the various elements of the criteria.

[12] She refers to work by Fritz Scharpf as a basis for this dichotomy.
[13] Certainly Rawls acknowledges that processes are typically not 'perfect'. Hence, he also includes categories like 'imperfect procedural justice' and 'quasi-pure procedural justice'. This issue is not of importance here.
[14] Cf. the work of Dworkin, Roemer and Sen.

Specifications of the criteria:

- *Legitimacy of the process*: Concerns how decisions are made, who participates and under what conditions. Accountability, transparency and the distribution of power and rights will be emphasized.
- *Legitimacy of outcomes:*
  - *Effectiveness*: Concerns the capacity to deliver reduced biodiversity loss. This includes also the capacity to raise funds, how well the governance structure fits the type of good or service involved, and the capacity to ensure additionality and permanence as well as avoiding leakage. Implicit is also how the system influences motivation, including the risk of corruption.
  - *Efficiency*: Concerns the ability to deliver cost-effective results. This involves both the direct cost of action – avoiding biodiversity loss – and the transaction costs related to the chosen governance structure.
  - *Equity:* Concerns the distributional effects of the chosen system. We will emphasize issues concerning income, linking also to the rights aspects. Special emphasis will be on consequences for the poor.

2. EXPERIENCES WITH PAYMENTS FOR ECOSYSTEM SERVICES (PES)

Payments for ecosystem services are defined in different ways in the literature. The definition by Wunder (2005:3) is the most used. Here PES is understood as:

1. a *voluntary* transaction where
2. a *well-defined* ES (environmental service, or land use likely to secure that service)
3. is being 'bought' by a (minimum one) ES *buyer*
4. from a (minimum one) ES *provider*
5. if and only if the ES provider secures ES provision (*conditionality*)

The emphasis on voluntary transactions (point 1) implies that PES is understood as a market for ecosystem services (MES). Engel et al. (2008) argue along similar lines, seeing it as a Coasean market solution emphasizing negotiations between private parties. Looking at the various examples of PES we observe that, in practice, it may take a variety of forms with predominantly public bodies/states acting as 'buyers'. Hence, Corbera et al. (2007a: 366) state that "PES are not actual markets where ecosystem services are sold to service buyers. The commodity is ill-defined, and, in most cases, governments play an intermediary role by mobilizing resources from consumers to a government fund, which then distributes financial resources to ecosystem-service stewards at a pre-established price."

Hence, PES, as defined by Wunder (2005), seems more like a theoretical concept than reflecting what is found in practice. We will therefore in the below analysis include other payment systems than those resting on transactions mainly taking place between private actors. We see PES as a wider concept with MES as a special case, acknowledging that any payment to providers of ecosystem services (ES) can be classified as PES.

Having reviewed a substantial part of the PES literature, the most noticeable issue is actually the efforts necessary to create a functioning market. First of all, rights must be defined and the 'commodity' must be demarcated. As emphasized by Corbera et al. (2007a) this is demanding. The group of users and providers must also be specified, a difficult task as exclusion is often very demanding. This explains why in PES schemes *the intermediary* – not the sellers and buyers – is actually the dominant agent. These are typically states, NGOs or private firms specializing in broker activities. The intermediary defines the good, typically establishes the group of 'sellers' and 'buyers' and often even sets a predefined price.

Table II.1 offers estimates concerning the size of various segments of payments for biodiversity conservation. Data are taken from Milder et al. (2010). The table includes also biodiversity oriented cap-and-trade systems.[15] Actually, these are not normally understood as PES (and are in this report discussed in Part III), but they are included here for the sake of comparison.

As we see, governments and multilateral organizations (e.g., GEF and the World Bank) are by far the most important 'buyers'. Moreover, most 'public sector' programs are found in developed countries. The EU and US agri-environmental schemes figure as very important elements of this category. However, also programs in countries like China and Costa Rica are mainly public, with the government as 'buyer'. It is also notable that cap-and-trade seems to be important in terms of generating capital from the private market. The share of the private (voluntary) market is around 1 per cent globally; a bit higher in developing countries. As the emphasis is on biodiversity conservation, payments for bio-prospecting etc. are not included. Here buyers will typically be private, and as indicated by Landell-Mills et al. (2002), such payments are of some significance.

Table II.1. Estimated size of payments for biodiversity conservation

Type of payment for ecosystem services	Size of payments (million USD/yr		'Buyer'	'Seller'
	Global	Developing countries		
Public sector	1450	190	Governments, multi-lateral organizations	Farmers, forest land owners, other private land stewards
Private, regulated (cap-and-trade for terrestrial habitats and species)	380	unknown	Public agencies (transportation departments etc.), real estate developers	Mitigation banking companies, public agencies, NGOs, private land stewards
Private, voluntary (corporate social responsibility, 'green' branding, philanthropic	10-17	5-8	Corporations, NGOs, individuals	Private land stewards, NGOs, private companies, indigenous and community groups

Source: Based on Milder et al. (2010)

[15] These concern e.g., biodiversity offsets and tradable development rights. Trades under CDM are not included here as it falls under carbon projects.

Milder et al. (2010) also offer data for water and carbon services. Payments for watershed protection are about 10 times those of biodiversity conservation. This is in itself an indication of the low level of funds available for biodiversity protection. We moreover note that the role of the public sector is even more distinct in this case. Looking at carbon sequestration, Milder et al. only include LULUCF[16]. While the total market for carbon is large, LULUCF-related activities are small. Here, however, the private market is dominating. At the same time, a substantial fraction – around 80 per cent – are undertaken in developing countries.

2.1 PROCESS LEGITIMACY

PES covers a variety of public, private and mixed systems. Hence, the mechanism also covers a variety of processes. To simplify the analysis, we will merely distinguish between public and market-based governance systems. In both cases the main participants are buyers, sellers and very often intermediaries. From the literature on MES/PES – case studies and larger reviews – we find that land owners are always the sellers, independent of whether they deliver 'new services' or refrain from actions that are environmentally detrimental. They are called 'providers' and they seem to be implicitly and exclusively granted the right to the status quo uses as indicated in Figure II.1.

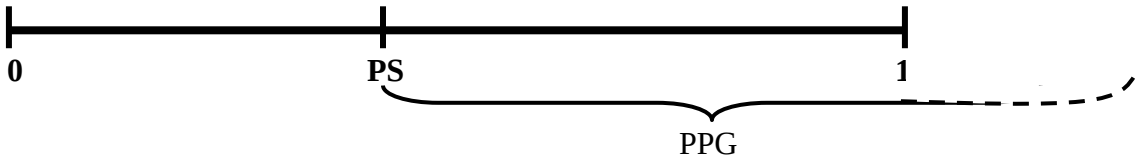

Figure II.1. Rights and compensation rules in the case of PES

We have observed almost no discussion about whether this is legitimate. Hence, the fundamental question of who should pay – what the reference point for payments should be – is hardly ever raised. This is the case whether we a) consider payments for biodiversity preservation – e.g., Wunder (2006); Claassen et al. (2008); Dobbs and Pretty (2008) – b) talk about carbon projects where developed country agencies buy sequestration from developing countries – e.g., Brown and Corbera (2003); Grieg-Gran et al. (2005); Corbera et al. (2007a and b); Wunder and Alban (2008) – c) look at local water services where downstream users pay upstream dwellers to undertake certain acts/stop certain activities to increase water quality – e.g., Grieg-Gran et al. (2005); Corbera (2007a); Kosoy et al. (2007) Wunder and Alban (2008); Muradian et al. (2008) – or d) look at combinations of all the above – e.g., Pagiola (2008).

At least from a liberal standpoint, a strong argument for PES as MES is that trades are voluntary. The users pay providers after negotiations, depending on who holds rights. We have, however, already emphasized that due to the difficulties for buyers as potential users of ES and the sellers to find each other and make direct trades, various forms of intermediaries dominate in PES. The

[16] Land use, land use changes and forestry

role of public authorities/governments is based on their power to tax citizens/apply more specific fees or levies. It also follows from the lower transaction costs (discussed later – see also Part I).

Despite its overwhelming role in PES, the legitimacy of government involvement is questioned. Pagiola et al. (2008:300) favor MES emphasizing that it "is likely to be sustainable, as it depends on the mutual self-interest of service users and providers and not on the whims of government or donor funding". This argument is very much at the core of process legitimacy. Pagiola et al. emphasize that self-interest is the right basis for biodiversity protection and that this interest is more stable than political will.

A counter-argument would not only emphasize the costs of setting up and running market systems. It would more fundamentally relate to the fact that ES are common goods, and based on that premise argue that it actually is the public and the citizens that should be the main decision-makers in defining what we want to protect and to what extent (Sagoff 1988; Vatn 2005, 2009). This is fundamentally a question about what proper issues for markets to handle are and what should belong to the public sphere (O'Neill 2007). These are issues that often get confused in the debate over PES. It is, however, crucial that in the debate over the form and extent of PES one brings this key issue to the fore.[17]

This relates also to the issue of accountability. To the extent that countries are governed democratically, political actors are accountable to the public. In markets, accountability is an issue between buyers and sellers or between the intermediary and the users and providers respectively. Moreover, being private deals, the parties control moreover the flow of information. We note that intermediaries – being governments/public bodies, NGOs or private brokers – will have a lot of power in the case of PES/MES. Hence, it is very important that their actions are transparent and not subject to various processes of secrecy. Again this relates not least to the fact that such transaction concern common goods. Certainly, governments may be corrupt and information may be concealed – but the principal difference is nevertheless important.

2.2 OUTCOME LEGITIMACY

2.2.1 Effectiveness

Turning to the 3Es, we note that the issue of effectiveness first of all concerns what results are obtained 'on the ground'. Is PES effective in protecting biodiversity? Actually, there are few rigorous empirical studies on the effects of PES on service production (Wunder et al. 2008); Pattanayak et al. 2010). Much more information exists about the way PES systems are set up, what payment formats are used, distributional issues, etc. A key reason for this is that measuring development of biodiversity is demanding. Baselines are repeatedly lacking, implying that there is no starting point against which to measure potential changes. Monitoring is also often weak or even missing outright.

As the literature does not offer a basis for an overall assessment of the effectiveness of PES, we will rather give a brief summary of a few cases that at least provide insights into the main issues. We have chosen examples from developing country contexts. One study is from Mexico. It is

[17] See also the more extensive discussion in Part I – Section 4.

actually a program for water management, but as the main strategy is to protect forests, it is of relevance to us. The other two studies are from Costa Rica; one single case and one meta-study.

The Mexican study – Alix-Garcia et al. (2010) – covers experience with the National Payments for Hydrological Services Program. One issue concerns additionality. They emphasize that the program may end up paying landowners for keeping forested land, which they would nevertheless have kept forested even in the absence of monetary incentives. The other factor that Alix-Garcia et al. highlight is the issue of leakage, where e.g. conserving forest in one area merely leads to deforestation being carried out in another area. They posit that although the mechanisms triggered by PES may work, the extent of avoided deforestation needs to be assessed at the regional or national level in international schemes. They find that the program has reduced the likelihood of deforestation by 6 to 11 per cent, which in turn represents an estimated 24 to 44 per cent decrease in the probability of any overall deforestation occurring. However, they also show that for credit-constrained households, the presence of a PES program may offer perverse incentives and trigger a process of substitution, which in turn leads to an overall net loss of forest. Such substitution effects appear to take place mostly in remote regions, supporting the notion that substitution occurs mainly where there are significant credit, land or labor rigidities. Summing up, they conclude that the program has had a modest direct effect, most notably in areas with good infrastructure, but that these direct effects may be undermined by leakage effects or through market effects induced by price changes.

The single case study form Costa Rica concerns the effectiveness of the best-known PES program in the country – the *Programa de Pagos por Servicios Ambientales* (PSA). Arriagada et al. (2011) find that there were moderate to large mean treatment effects on forest cover on farms in the study area, an impact they estimate to cover 11 to 17 per cent of the mean contracted forest area. The area of the PSA program under study, the Sarapiquí region, showed a moderate effect on forest cover, with a net increase in total forest cover on participating farms. However, it was not possible to determine whether the impact of the PSA was due to the prevention of mature forest clearance, or from forest re-growth. It was furthermore not possible to define the quality of the forest cover, or the quality of the ecosystem services provided. The last point is emphasized by Daniels et al. (2010) as well, who point out that PES in Costa Rica has forest cover serving as a proxy for ecosystem services, and explicit, site-specific indicators of ecosystem services have not been integrated into the set-up. This represents a challenge in assessing the impact of PES in terms of actually providing ecosystem services.

Arriagada (2008) finds that PES had a positive and significant impact on forest gain and net deforestation between 1997 and 2005 in the census tracts that contain at least one PES forest conservation contract signed during the first eight years of the program. Arriagada's findings are surprising considering that he only evaluated the conservation modality of PES contracts, suggesting that conservation contracts have also been allocated to non-forest lands. But a differential effect of PES conservation versus reforestation and agro-forestry modalities is to be expected

The meta-analysis (Daniels et al. 2010) covers four case studies, two national and two sub-regional. The study contextualizes the evolution of PES programs in Costa Rica, arguing that the starting point for PES is rather fuzzy. For instance historic forest area data are extremely variable. Another issue is to account for the roughly 178,000 ha of forest plantations in the

country (FAO 2005). These factors in turn lead to a lack of clear demarcation, both spatially and over time, which has implications for measuring the real impact of PES. Nevertheless, their perhaps slightly surprising conclusion, which runs counter to the Alix-Garcia et al. (2010) assertion that effectiveness evaluations should occur on a national scale, is that the national studies conclude that PES has not lowered gross deforestation rates, *but* that the sub-national studies show evidence of additionality. The key to the seeming paradox is to separately identify the effect of PES on deforestation and forest gain by location (Arriagada, 2008). The sub-regional data suggested that forest land uses increased in relative attractiveness as compared to leaving land in a transitional state of *charral*. This brings to the fore a dilemma with national-scale analysis of PES programs that have been poorly targeted, namely that "one could erroneously determine that there were no impacts and thus undermine funding and political support for the program when in fact the program may have heterogeneous impacts (works in some places and not in others). Heterogeneity can arise because of heterogeneity in the quality of implementation or heterogeneous responses by different subgroups in the country" (Arriagada et al. 2011: 26). They therefore recommend that PES program designers should incorporate *ex ante* evaluation designs into the project implementation, to allow for better assessments and understanding of the dynamics playing out.

Daniels et al. (2010) also note that the present legislation, which authorizes payments meant to internalize the benefits of ecosystem functioning, simultaneously bans the clearance of forests (see Text Box I.2 (Part I)). According to the authors almost 90 per cent of the PES contract areas could have been kept forested if landholders had abided by the law. However, they also state that PES may serve as a "pre-condition for the application of Article 19 since the ban on forest clearing probably would not have been politically feasible without PES" (ibid.:2119). Hence, payments can be seen as a necessary compensation for lost use rights – see also Pagiola (2008).

Turning next to the issue of fundraising capacity – which defines the aggregate size of PES projects – we note that the international community is not satisfied with the present status. This dissatisfaction has resulted in the emergence of the resource mobilization strategy being emphasized at both CBD COP 9 and 10 – see the introduction to this report. Table 1 also indicates that funds for PES are small. This is especially the case for developing countries. In relation to that, we should also note that in the case of PES programs in both Mexico and Costa Rica more landowners have wanted to participate than the money available has allowed for. Wunder et al. (2008) document a factor of 1:3.

Concerning the type of financial sources used at present, we have already established that public money constitutes by far the main source. Text Box II.1 gives an overview over the various ways governments raise funds for biodiversity protection. While in the case of watershed protection local public funding plays quite a substantial role – through issuing an extra fee on the water bill etc. – state and federal governments play a much more important role in the case of biodiversity protection. As state taxes are typically not earmarked, it is reasonable to assume that the share of various governmental incomes that go to biodiversity protection is equal to their share in the total budget. There are some examples of earmarked funding, though. One well-known example is the use of a percentage of the gasoline tax in Costa Rica to finance their PES program (Grieg Gran et al. 2005).

Text box II.1: Examples of mechanisms to generate government funding for biodiversity protection

Ordinary income taxes are normally the main basis for government income. Further options are:

Value-added tax (VAT)
This is the most well-known form of mechanism for governments to raise revenue,, and all industrialized countries except the US have a VAT or a near equivalent. The principle of the VAT is that the government levies a tax on the value-added, i. e. the price difference between raw materials and an improved product, at every stage of the supply chain.

Production tax
A production tax is a tax upon the production of certain industries which is substituted for an *ad valorem* tax imposed under general tax laws. It is a tax in lieu of all other taxes on the leases and minerals or the equipment used in producing or in the operation of oil wells or mines.

Consumption tax
The basic idea of a consumption tax is that a tax should be put on what we consume, rather than what we earn. It is levied on commodities or services and included as part of the retail price of those commodities or services. Consumption taxes are e.g. levied on the consumption of meat, tobacco and sugar.

Ecological value added tax
The ecological value added tax is a special kind of VAT that taxes production that has a lower ecological impact lower, making such production cheaper, and conversely, taxes production that has a bigger negative ecological impact more heavily, thus rendering such production forms more expensive.

Ecological consumption tax
Based on the same premise as the 'ordinary' consumption tax, but places a heavier tax burden on the consumption of goods and services that are polluting, or have a detrimental environmental effect.

Tourism-Based Revenues
Tourism is the largest industry in the world, and tourists are often attracted to protected areas. National parks and conservation sites can generate revenues at the site, national and even international level through visitor entrance and/or user fees, concession fees, licenses and permits, tourism-based taxes, airport or country entry fees, airplane or cruise boat passenger assessments, and voluntary contributions of tourism operators and tourists.

Resource Extraction Fees
Financing conservation through revenues from fines, fees or royalties collected from forestry, energy or mining companies is a way of holding companies accountable for damage or disturbance that result directly from their operations near fragile or high biodiversity ecosystems. Resource extraction fees are usually paid as compensation to mitigate direct impacts on biodiversity (and hence are sometimes referred to as 'biodiversity offsets'.

Earmarked Taxes and Other Charges
Earmarking sources of revenue allows governments to guarantee financial resources for environmental programs through public financing tools such as taxes assessed on certain goods and services, such as e.g. gasoline, or to other mechanisms such as bonds and lotteries. These funds are then "earmarked" for specific uses by the government, such as offsetting environmental degradation.

Flight taxes
A levy on individual travelers has been suggested in order to raise money targeted towards climate adaptation projects. Such a mechanism could also be utilized for biodiversity conservation purposes, though the link is not as direct as that of air traffic pollution and climate change.

Sources; The Financial Dictionary, Morrison (2007), WWF (2007)

The challenge of raising more resources depends mainly on the political will to do so, either through direct public spending or establishing liabilities for the private sector. Certainly, there is a potential of increasing the volume of voluntary payments. Milder et al. (2010) refer to processes among industry pushing self-regulation of biodiversity impacts via fora like commodity roundtables (referring to palm oil and soybean) and criteria for international lending (referring to the Equator Principles[18]). Nevertheless, it is through public definitions of obligations and through public taxing that any sizeable sources are foreseeable. In Section 2.3 we discuss one example of expanding this basis.

A fundamental reason for highlighting the important role of governments in financing biodiversity (taxes) or facilitating the mobilization of private finance (through e.g. caps) is the fact that ecosystem services are common goods[19]. So if some pay, the good that is produced or protected becomes available to everybody[20]. Similarly, if others pay, single actors gain nothing by paying themselves (the free-rider problem). The decision by governments has the capacity to cut across this dilemma. Taken literally, this reasoning should imply that no voluntary payments appear. We have in Part I discussed why such payments may still occur. While firms may do it out of self-interest – positioning themselves in markets where social corporate responsibility have importance for customers – the act of the customers themselves must be based on motives going beyond self-interest. The core issue is the strength of this motivation and how it can be further strengthened. Per date it is rather weak – cf. Table II.1.

While voluntary markets could play an important supplementary role in financing biodiversity protection, the information problems involved also need to be mentioned. While public authorities have the capacity to set up special systems for monitoring and evaluating the status of the environment, each firm or individual will have much more restricted insights concerning what services need protection or management. Conversely, much more resources would be needed if each firm/individual were to develop the necessary overview of the needs than if this task was delegated to specialists. Key to establishing reference levels upon which to base rights and liabilities is long term consistent and spatially representative environmental monitoring, continuity of which can only be assured by public bodies (the risk of discontinuities in environmental monitoring datasets increases when private companies are replaced in competition for monitoring contracts).

In the literature there is increasing emphasis on the importance of pre-existing institutional and cultural factors for the functioning and effectiveness of PES – e.g., Mayrand and Paquin (2004); Karsenty (2007); Corbera et al. (2007a and b); Muradian et al. (2008); Clements et al. (2010). A core issue concerns how the introduced payment system fits local relations. Several aspects are important, but perhaps the most significant is the issue of property rights. Especially in developing countries these may be unclear or contested. This creates a potential obstacle in terms of implementing PES (Angelsen and Wertz-Kanounnikoff 2008).

[18] See http://www.equator-principles.com/principles.shtml

[19] By common goods we mean both public goods and common-pool resources. These resource categories have both high exclusion costs. The difference between the two concerns rivalry in consumption/use. In the case of a public good there is no such rivalry – e.g., a service can be consumed by all without reducing its quality – typically 'existence values'. In the case of a common-pool resource use will reduce the quality. Some services related to biodiversity fall in the former and some in the latter category.

[20] This is the so-called 1/n problem. See Part I, Section 7 for a brief discussion.

In assessing this, we should first note that 86 per cent of the world's forests are owned by states (PEFK 2011). In Africa and Asia figures are close to 100 per cent. This is in itself an important fact for the implementation of PES and other biodiversity protection measures. Next, we observe that much of these forests are inhabited by communities that depend on forests for their livelihood (Vedeld et al. 2007). Their rights are, however, often unclear and insecure (Unruh 2008). Some argue that land must be privatized to make PES work well. The literature is somewhat contradictory on this issue, however. In a study of PES in Mexico Corbera and Brown (2008) conclude that a common property regime with insecure property rights may be a constraint for forest carbon project development. Certainly, lack of title increases uncertainty for buyers, and in some cases private actors have demanded formal titling to be willing to pay. In other cases people holding land in common have involved themselves in PES projects as a way to strengthen their perceived rights to the land. PES may hence result in strengthened tenure security for local people (Corbera et al. 2007b). At the same time, the latter study shows that rights need neither be individual nor fully formalized to ensure participation in PES projects. They show that PES arrangements have been established also on land held in common. Other examples point in the same direction. In the Noel Kempff PES carbon project in Bolivia on avoided deforestation, the project developers recognized informal, customary rights of local communities which are now regarded as a key factor for the success of the project (Asquit et al. 2002).

Local conditions of importance for effectiveness go beyond property rights. Corbera et al. (2007b) observe that existing organizations and their local standing play a crucial role in the process of establishing PES. This is not surprising, given the uncertainties involved and the importance of intermediaries to set up PES schemes. Similarly, when introducing PES, one needs to be very aware of local conflicts over resources. Corbera et al. (2007a) show how PES programs may actually reinforce disputes over access and control over forest resources. However, they also show how some of these problems can be countered by emphasizing trust building and participation.

2.2.2 Efficiency[21]

With respect to efficiency, we will restrict our analysis to the issue of cost-effective delivery of defined ecosystem services. Costs are of two kinds; the costs of producing the service and the costs of administering the governance structures that are needed. The latter kind of costs is usually called transaction costs.

The costs of producing ecosystem services are typically not so much about the costs of making them as about the loss of income from alternative use, though management costs are certainly involved in some cases. Often the service is produced simply by leaving the natural resources 'untouched'. Hence, costs are opportunity costs – the income forgone by the owner when unacceptable to use the resource or land for purposes that generate income. These costs may vary substantially according to location, quality of soils, type of production etc. While Stern (2007) emphasizes that opportunity costs for forests are low, Romero and Andrade (2004) argue that they are often highly underestimated. This partly concerns which alternative products are included in the analysis and what costs to include. The costs may not only accrue to land owners. Jobs in processing industries may also be lost and if alternative income opportunities are few or

[21] This section is to a large extent based on Vatn (2010)

less attractive, there will be costs also here. Emphasizing this, one should also note that opportunity costs may be overestimated in the longer run if farmers means of substituting prohibited on-farm for off-farm activities are not accounted for (Barton et al., 2009).

In the theoretical literature on PES, it is often concluded that market systems are more efficient than state-based systems. Empirically it is much harder to find a basis for reaching such a conclusion. Wunder et al. (2008:851) believe that markets or user-based systems are "much more likely to be efficient" than government financed programs. Their argument is partly based on the idea that the evaluation of the values involved is more accurate. Budget fights within governments are avoided, and payments are expected to be better targeted. As the cases they review show, the delineation between user-based and government-based very much follows distinctions between different kinds of services characterized by different exclusion cost structures. Typically user-based programs focus on a single service that is comparatively easy to demarcate. The service is simply more commodity-like. On the other hand, government programs cover less specific services. The authors' efficiency claim, therefore, does not acknowledge the variation in transaction costs involved as markets seem to pick the 'lower-hanging fruits'.

We should first note that the number of involved parties is important for transaction costs. If actors are few, market trades may be the least costly in transaction costs terms. As the number of agents grows, it becomes much more costly to use markets since the number of deals increases substantially. States or local public bodies such as city councils, can much easier raise the necessary funding through taxes or fees and the negotiations with providers is simplified. Certainly, the latter demands that the public body is seen as legitimate. This may not always be the case – but some private buyers or intermediaries may face similar challenges. Likewise, the cost of targeting seems underestimated in the reasoning of Wunder et al. (ibid.). A lower degree of targeting by using e.g., flat rate payments like governments often do may be more than offset by lower transaction costs. Certainly, evaluating the costs related to loss of precision in using such systems is difficult. Barton et al. (2009) point at the potential loss of representativity. It should finally be mentioned that broader, government sponsored schemes may offer opportunities for economies of scope (Vatn et al. 2002).

In relation to this, it should also be mentioned that Corbera et al. (2007b) find transaction costs to be lower if communities are involved, as opposed to individual landholders. The authors emphasize also that the level of knowledge among e.g. farmers when contracts are made at community level tend to be lower than when they are directly involved. Hence, there is again a trade-off involved. Working through collectives reduces transaction costs, but at the potential expense of lower overall knowledge dispersal.

Wunder et al. (2008) offer some insights about transaction costs for PES projects mainly in developing countries. They find costs to be in the order of 30-100 per cent compared to the final payments. Transaction costs concerns both the setting up of the governance structures and the running of them. While Wunder and Alban (2008) and Wunder et al. (2008) emphasize that the former is larger than the latter, there are reasons to believe that this depends much on the kind of governance structure. Creating a market may be very demanding while running it is less costly. Systems based on government payments may be much easier to set up as the necessary structures (at least for collecting the necessary money) may already exist.

The costs of administering the payments may next depend heavily on the type of payment scheme as illustrated by the literature on transaction costs related to environmental programs. In this case, existing data are mainly from agri-environmental programs in developed countries – e.g., Falconer and Whitby (1999); Falconer and Saunders (2002); Vatn (2002) and Rørstad et al. (2007). The findings have, however, general value.

While flat rate payments related to easily observed resources like land tend to have transaction costs at the level of a few percent of the PES payment itself, transaction costs increase, often sharply, as soon as payments are more specific. Rørstad et al. (2007) show transaction costs estimates ranging from 1-2 per cent of the payments for flat rate acreage and livestock payments with simplified control to almost 70 per cent for a program where the payment is for a very specific amenity with substantial control involved. Falconer and Saunders (2002) document a case with a wildlife enhancement scheme where transaction costs were 110 per cent of the payment. Note should be taken of the effect of the payment level on these percentages.

In trying to explain the variation, Rørstad et al. (2007) draws on Williamson (1985). Three factors stand out as important. First of all, how easy it is to observe the good or service is crucial. Using proxies like land under certain vegetation type reduces transaction costs substantially as compared to defining and paying for the service itself. The other two variables of importance are frequency and asset specificity. Increased frequency – number of repeated deals or contracts – was found to reduce per unit transaction costs while asset specificity – how complex the good or proxy is – as expected, had the opposite effect. Certainly, experience, i.e. running systems over a period of several years, would be expected to reduce transaction costs. We do not know, however, of any study that has analyzed this.

2.2.3 Equity considerations

The literature on equity issues related to PES is quite extensive. This reflects not least concerns for the poor. Several issues are involved. Let us first note that PES implies consistent payments to 'service providers'. This happen independent of whether they actually produce the service or whether they refrain from actions leading to the destruction of natural habitats. As people dependent on natural resources, especially in developing countries, are generally poor, this implies a pro-poor emphasis implicit in PES. However, rich people will also be paid, and the worry is that they are capable of 'grabbing' most of the money. Nevertheless, the basic rights implied by PES might be seen to protect the interests of those at risk of potentially losing their livelihoods as a result of conservation efforts. In the discussion of this, two issues have been raised. The first concerns whether the poor will be enrolled at all, and the second concerns whether the poor may lose access to land on which they depend. In the following analysis we will only look at PES projects in developing countries.

Examining the first question, the general picture is that the poor/smaller land holders participate less than the richer/those with more land (e.g., Zbinden and Lee 2005; Clements et al. 2010). There are two main arguments for this. The first concerns transaction costs – e.g., Grieg-Gran et al. (2005); Pagiola et al. (2008); Wunder (2008); Wunder et al. (2008). More land will be protected per transaction if contracts are made with large as opposed to small land holders. By

undertaking local institutional changes, such as organizing small land-holders, this tendency can be counteracted. The second concerns the fact that many poor have no more land than what is needed for meeting basic needs. Then there is no opportunity for them to enroll. This kind of dynamic is found a lot – see e.g., Grieg-Gran and Bishop (2004); Corbera et al. (2007b); Westermann (2007); Wunder and Alban (2008) and Wunder et al (2008). Milder et al. (2010) adds to this story by emphasizing that poor people are often less used to engage in the kind of contracting needed.

On the other hand, the poor do not lose out from not being involved, either. As payments are typically directed at covering opportunity costs, one would expect them, broadly speaking, to be neutral as far as income distribution is concerned.[22] The threat of poor people losing access to land and forest resources is, therefore a much more serious issue. For example, informed by case studies in Uganda, Nakakaawa et al. (2011)[23] bring attention to the fact that though reforestation efforts have been presented as being quite successful in the Ugandan context, they do have negative livelihoods impacts for certain groups.

Similarly, Sullivan (2010) argues that significant displacement effects can arise from introducing environmental 'value-adding' initiatives into what she terms survival economies. The risks to people mainly relate to the prevalent lack of formal tenure arrangements, and the often complex communitarian relationships that are based on sharing and a broad knowledge of local nature, dynamic practices and knowledge systems that external initiatives may threaten to disrupt. There is, therefore, a need to be wary of the 'win-win' discourse that is often presented with regard to reconciling conservation measures and poverty reduction. As Benjaminsen and Svarstad (2010: 392) argue, large conservation groups, government officials, development agencies, celebrities, tourism companies, other corporations and scientists subscribe to the 'sustainable development historic bloc' that "present markets, commodifications and consumerism as key tools to ensure a combination of economic growth and biodiversity conservation."[24]

One should also note that while PES may result in strengthened tenure security for the poor, they also make land more valuable and represent a further push towards loss of access for those depending on renting land. Where rights to forests are overlapping, unclear, and based on customary usage, project developers need to be particularly alert to the traditional rights of poorer and less vocal actors (Cleaver 2002).

There are also other potential indirect negative effects for the poor from PES. First of all, they may lose jobs associated with industries based on the harvesting of natural resources. Therefore Karsenty (2007) argues that a broad definition of opportunity costs is needed to ensure that PES does not put costs on the poor. He also sees a danger in that the poor become 'low level rentiers'. There is finally the argument that as more land is protected, prices for commodities like food will increase. This will affect those among the poor that depend on buying food. Clements et al. (2010) document an example of this effect.

[22] This is not the case where forested land is left idle, by e.g., absentee landownership (Miranda et al., 2006).
[23] Drawing also on Eraker (2000) and Lang and Byakola (2006).
[24] Referring to Igoe (2010), drawing on Sklair (2001).

Some also engage in PES in the hope that it could even reduce poverty. The idea is that there could be a win-win between protection and poverty eradication as long as payments are involved. In relation to this, the literature is pretty consistent. Tradeoffs between effectiveness, efficiency and equity are clear (Mayrand and Paquin (2004). While the poor may not necessarily lose (see above) there are few mechanisms that result in their gain. Generally, poor people tend to sell cheap (Karsenty 2007). Covering just opportunity costs will not ensure development; rather it is likely to result in stagnation. Hence, to the extent that development is included as a goal in PES, specific pro-poor initiatives and safeguards are needed. This is emphasized throughout the literature – e.g., Landell-Mills and Porras (2002); Grieg-Gran et al. (2005); Wertz-Kanounnikoff (2006); Wertz-Kanounnikoff et al. (2008).

2.3 THE TOBIN TAX – A WAY TO EXPAND THE FUNDING OF PES?

As there are financial constraints to PES, one must certainly ask whether there are other ways such programs could be strengthened than those mentioned in Text box II.1. In this section we will look briefly at the Tobin tax as such an alternative. This kind of financing system is of specific relevance as it may be used to ease the financial situation for biodiversity protection in developing countries. It should be noted that while it is based on state action, it demands international agreements.

The Tobin Tax is named after the Nobel laureate James Tobin. First conceived in 1974, the Tobin tax was initially meant as a response to the increasing volatility of foreign currency markets, which were at the time making up a major part of trade transactions. By instituting a nominal excise tax on cross-border currency transactions, about 0.1 to 0.25 per cent of the volume of the transaction, Tobin figured that such a tax would discourage short-term speculation without damaging long-term investments. Such taxes would be legislated by national governments, who would gain greater sovereign control over their currencies, but would need follow-up through multilateral co-operation (e.g. to prevent the migration of the foreign exchange market to tax havens).

However, over time the Tobin tax also came to be seen as a 'Robin Hood' tax, a means of taxing financial speculation to create funds that could be ploughed into particular global priority projects linked to environment and development. Though the Tobin tax has been lauded by many as a potentially worthwhile instrument of regulation and redistribution, it has met with much resistance from the financial sector. It was not until after the financial crisis that interest in the Tobin tax was resuscitated and started gaining some real traction. For instance, in 2009 the then Prime Minister of the UK, Gordon Brown, and France's President (!!) Nicolas Sarkozy suggested that a Tobin-style tax could be used to help developing countries cope with climate change, a proposition that was followed up with a EU spending commitment of €2.4bn (Traynor 2009). The idea of the Tobin tax – more soberly dubbed the Financial Transaction Tax – is an "idea whose time has come" according to a report in the Guardian (Chang and Green 2011). The level of taxation proposed is very low – a mere 0.05 per cent – but would still help in dampening the most speculative money flows. The Tobin tax is taking on several dimensions, as it were – first it was mainly intended as a device to dampen currency market fluctuations, and then increasingly as a means to raise funding for development projects (witness for instance the recent

campaign to use a FTT levy to finance health projects (WHO 2010) and also increasingly becoming thought of as a 'green' global tax in the sense of funding climate change adaptation projects. The proposition here is to use such a tax to fund also other projects than climate change related ones. This would demand a higher tax level than those typically discussed.[25]

3. EXPERIENCES WITH CONSERVATION TRUST FUNDS (CTFS)[26]

As emphasized, intermediaries are core actors in payments for ecosystem services. Conservation Trust Funds (CTFs), also called environmental funds, are a special type of intermediary. It is of particular interest to us as such a type of funds is dominantly organized to attract financial resources to biodiversity protection; they are active in developing countries and are typically operating outside existing governmental administrations. Such funds have existed since the early 1990s. According to Spergel and Taïeb (2008) there now exist about 50 CTFs. They are mainly found in Latin America and the Caribbean region. There are, however, some CTFs in Africa and Asia, and in some countries that are part of the former Soviet Union.

CTFs are operating at national levels and many have been established by special national legislations or decrees (Spergel and Wells 2009). They can be viewed as a type of public-private partnership as the boards of these funds are constituted of a combination of representatives from civil society, business, academic organizations, donors and government officials. Non-governmental representatives are typically in majority (GEF 1998).

The literature on CTFs is generally quite positive concerning their accomplishments. It documents high overall political *legitimacy*. This is not least explained by the fact that CTFs are often established by initiatives from the hosting state. The wide representation on the boards also strengthens legitimacy. The system built for these funds ensures in general good transparency regarding the use of money. In many CTFs the board members are appointed as individuals to avoid too close ties to specific interests – however, this practice could raise issues of accountability. We have found no discussions of this issue, though. Spergel and Taïeb (2008) emphasize that the business sector is also generally positive to CTFs.

Concerning *effectiveness*, the first point to note is that CTFs are mid- to long-term engagements. Compared to single PES project initiatives, this ensures more permanence. CTFs are, however, not set up as permanent structures. They typically have defined duration periods of 20 years or less.

It seems quite clear that the establishment of CTFs was motivated by the wish to attract more resources to national environmental protection activities like national parks and other forms of biodiversity protection. According to Spergel and Wells (2009), many finance ministries initially opposed the establishment of such a structure, but were persuaded to accept the solution due to its ability to access private funds – not least at the international level. Despite this, the main

[25] Note, however, to the extent the tax is high enough to effectively regulate financial speculation, the basis for the tax is reduced. Hence, there is a limit to expanding the tax also as an income source.
[26] This section draws heavily on Vatn and Vedeld (2011)

source of CTF finances is public; e.g., the Global Environment Facility (GEF), national public donors and also the government of the host country itself. According to Spergel and Taïeb (2008) GEF and donor funding cover together almost 75 per cent of the funding for CTFs worldwide. Hence, the already noted point that public money plays a major role for PES in general also comes through here, even if the rationale of establishing CTFs was the contrary. Spergel and Taïeb emphasize, though, that corporations, non-profit organizations and foundations play an increasing role.

Despite the fact that many of the above observations are positive, the literature emphasizes that the picture is actually rather uncertain concerning the impact of CFT activities. As for PES projects in general, the focus has been more on 'process' than 'impact' monitoring – i.e., on documenting fund raising, decision-making and allocation of funds (GEF 1998; Spergel and Taïeb 2008). As in the case of PES more generally, this makes it difficult to assess the effectiveness. Impact evaluation of CTFs face the additional problem, that causality must be established between projects in specific location and funding by CTFs as distinct from other types of project funding.

Turning to *efficiency*, it has been argued that CTFs increase costs by establishing an additional management level between buyers and sellers – see Bayon et al. (1999). This kind of argument does not seem to be very well substantiated, as also discussed earlier. Rather, professional intermediaries could reduce transaction costs. How efficient CTFs are at doing that job is a bit difficult to estimate given present data. GEF (1998) documents that funds have operating costs in the range of 25-30 per cent of the total. Spergel and Taïeb (2008) record administrative costs in the order of 10-20 per cent of total annual budgets. These lower figures may as well be explained by increasing budgets over time (fixed cost issues) as by increased efficiency. It should be expected, however, that CTFs become more professional as they gain experience. The transaction cost figures presented earlier for PES (Wunder et al. 2008) were a bit higher (15-50 per cent if recalculated in accordance with the above format). This may be explained by the fact that the latter figures not only include costs for the intermediaries, but also transaction costs for the local organization and land owners running the projects. Note also that the intermediaries in the relevant PES cases covered by Wunder et al. (2008) may in many cases be CTFs.

A reason for establishing CTFs has been to reduce corruption by making the system more transparent. It has also been an argument to ensure independence from governments by increasing private donor confidence that money will be spent efficiently and avoid resources being redirected to other government uses. The aim has been to provide continuity by preventing changes in priorities following from changes in government (Starke 1995). These arguments resemble a bit that of Pagiola et al. (2008) discussed previously. We note that there is a tendency in parts of the PES literature to distrust the political process. Some of these arguments follow experiences from corrupt systems. Some seem to be more ideologically based.

In relation to this, both GEF (1998) and Spergel and Taïeb (2008) emphasize quite strongly that CTFs ought to avoid governmental majority on the board. The reason is that one in this way ensures focus on the purpose of the CTF and avoids decisions being made along political lines. This is not a straightforward argument as it seems to assume that political priorities are generally not legitimate. The argument could be turned around, emphasizing that it is a problem with CTFs

that they operate outside the general political structures and processes, implying that it is donors and not the democratic processes that decide on environmental protection issues. Certainly, the argument fares differently if the political process is undemocratic or corrupted. Similarly, the short term perspective of most political systems could be an argument for lifting long term issues like environmental ones out of the standard political process. Democratic systems may themselves establish CTF type structures precisely for that reason.

Arguments in favor of CTFs also concern their capacity to avoid the rigidity of many state administrations. In line with this, Spergel and Taïeb (op.cit.) offer examples of very bureaucratic systems for management if the CTF is underlying e.g., a ministry. The potential gain that the CTFs may represent in reducing bureaucracy depends on the kind of public management system that exists in the host country.

As already emphasized, PES may not have a well defined and well organized receiver. In relation to this, Bayon et al. (1999) emphasize that effective CTFs tend to expand beyond the role as a pure financial mechanism noting that

> "They often had to play roles in building institutional capacity and private-public partnerships, developing agile management approaches, nurturing community groups becoming involved in environmental activities for the first time, and contributing to the articulation of environmental priorities and strategies" (p. 8).

The authors note, however, that many CTFs were not appropriately set up to handle such a wider set of issues. This indicates that they were unexpected.

Turning finally to *equity*, the literature notes that there has generally been a conflict between biodiversity conservation and securing local livelihoods. This concerns not least protected area management (e.g., Vedeld 2002; Hutton et al. 2005). As CTFs are primarily geared towards supporting the financing of managing such areas (GEF 1998; Spergel and Taïeb 2008), the issue is most probably challenging also for these organizations. Spergel and Wells (2009:81) point towards a specific aspect of this stating that "CTFs sometimes struggle with governments that want to use CTFs for poverty alleviation projects which are not related to conservation."

The literature also emphasizes that CTFs have donor relations and/or a management culture with quite strong conservation values, a conservation oriented competence and they tend to not engage in community based management or outreach activities. Hence, there seems, to be a lack of a local community orientation. CTFs obviously vary in strategies and competence. Nevertheless, an increased focus on training staff to carry out more outreach and collaborative type management support seems to be needed.

4. EXPERIENCE WITH THE CLEAN DEVELOPMENT MECHANISM (CDM)

The Clean Development Mechanism (CDM) is one of three so-called flexibility mechanisms of the international climate regime – the Kyoto protocol. It is a form of offset system, where countries that have reduction responsibilities according to the protocol – industrial countries and

countries in transition – can undertake parts of these in developing countries against paying compensation to them. While the main focus of CDM is on carbon mitigation, there is also a sustainability clause included. Moreover forests are included in CDM in the form of afforestation and reforestation projects.

Our analyses of the CDM will be much more superficial compared to the PES analysis. The aim of this section is simply to highlight some of the experiences with CDM to enhance the understanding of mechanisms involved when paying for ecosystem services. This includes not least motivational issues.

The financial basis for CDM is created by establishing the caps on CO_2 emissions as defined by the Kyoto protocol for Annex B countries[27]. These caps have been offered to countries for free (PGP).[28] Countries may undertake reductions at home or through trade – in this case with developing countries. Figure II.2 illustrates this. The value '1' implies here no emissions of climate gases.

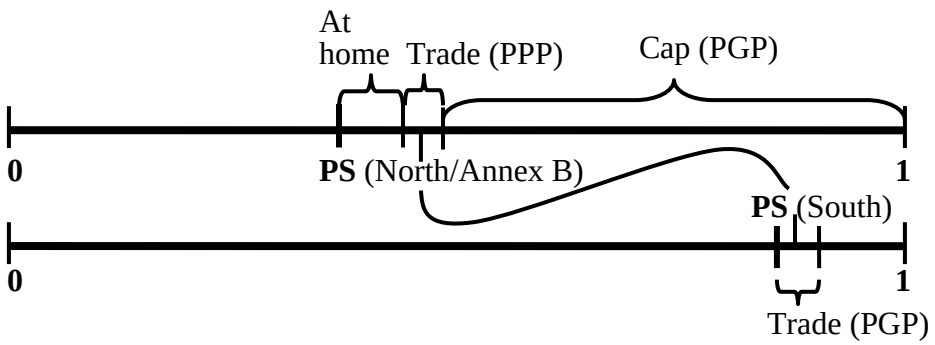

Figure II.2. Rights and compensation rules in the case of PES

While emissions are much lower in developing countries, the logic underpinning CDM is that reducing emissions there is often cheaper than to do it in the industrialized world. It is the cap that creates the environmental effects of the Kyoto regime. Hence, the *effectiveness* is fundamentally related to the level of emission cuts that are demanded by the Kyoto protocol. According to the Word Bank (2010), CDM mitigation activities accounted for 404 and 211 $MtCO_2e$ emission reductions in 2008 and 2009 respectively. This accounted for 8.4 and 2.4 per cent of the total carbon market volumes in these years. Measured in monetary terms the percentages are 4.8 and 1.8 respectively. Hence, CDM carbon is generally cheaper than other options. In evaluating these figures, it should be noted that EU – the main actor in the carbon markets – has set a rather strict limit on how much can be traded under the CDM. Of the total volumes traded under CDM, forest projects cover, however, only about 0.6 per cent of the total. Projects in agriculture amount to 4.4 per cent. Energy industries dominate (more than 60 per cent) (UNFCCC 2010).

[27] Annex B countries are those that have obligations to reduce emissions according to the protocol. They are industrial countries and some countries in transition.
[28] Countries may still sell or auction these rights to firms etc. EU/Norway does this for a fraction of the cap.

A main reason why forests are not competitive under CDM relates to the high transactions costs relative to other options. High transaction costs relate again to property rights issues (e.g., Kerr et al. 2004; Lipper and Cavatassi 2004, Cosbey et al. 2005) and the generally high demands set on a country's institutions to make trade in forest carbon possible. Because of this, Africa is generally very little involved in CDM – less than 2 per cent of CERs – while China (51.1 per cent and India (17.7 per cent) top the list (UNFCCC 2010). The rather high level of controversy around some forest projects should also be noted.

The literature on CDM is quite instructive regarding various motivational issues. The key motive for being involved in CDM is to find cheaper solutions to reduce emissions below the cap. Hence, as opposed to PES where the motive is to pay for a better service, CDM is a way to reduce costs for reaching a target. This seems to influence the motivations of those involved. Sutter (2003); Olsen (2007); and Olsen and Fenhann (2008) show how this tends to create 'a race to the bottom' in the sense that going for the cheapest carbon has weakened the ability of CDM to deliver well on the sustainability criteria, like biodiversity protection.

In relation to this, the issue of additionality is strongly emphasized in the literature. There is an incentive among both the buyers and sellers to overestimate the effects of a project – e.g., Schneider (2007) and Sovacool and Brown (2009). Hence, the CDM has been much accused of fraud; see also Ostrom (2009) and Spash (2010).

One may ask why such problems are so conspicuous in the case of CDM, but relatively absent in the case of CTFs. Two aspects appear relevant. First, CTFs may represent a more transparent system. Second, CTFs are oriented at funding national parks and other activities to protect biodiversity. Hence, there are no off-sets, compliance issues involved, no credits issued. Because of this, there are fewer motives towards manipulating data on expected impacts. As we have seen, impacts are not even well documented in the case of most CTFs.

As noted, CTFs represent public/voluntary funding. It is interesting to observe that there seems to be a general difference in motivations among those engaged in voluntary carbon markets as opposed to those engaged in CDM. Neeff et al. (2009) document a clear willingness to pay for more than the carbon in the case of the voluntary market. While buyers of CDM credits look for cheap carbon, those operating in voluntary markets are inclined to think more widely as they are acting to support the common good or building consumer trust. In the latter case, they may be looking for projects that can tell a good story – for 'charismatic carbon' (Stenslie 2010). This illustrates how the institutional structure around the trade influences the focus of traders.

Also, CDM demands a sector of intermediaries. Many have been attracted by the size of the market. Lloyd and Subbaro (2008) emphasize that it has caught the attention of many intermediaries that are mainly 'after the money' and the wider aims of CDM have to some extent been sidelined. In relation to this, one should note that the kind of intermediaries involved in a market solution seems to make a difference with regard to performance. Some intermediaries are 'pure' traders, while others – like some NGOs and CTFs – are involved for broader reasons than just earning income from the trades. In the case of CTFs, this seems clearly to be the case. Concerning NGOs we have found no studies comparing their behavior with 'for-profit' intermediaries. In

the case of CDM, there is one indication though. The Gold Standard for carbon credits was developed by NGOs to strengthen the emphasis on sustainable development (Stenslie (2010).

Part III:
NEW APPROACHES AND FINANCIAL MECHANISMS FOR SECURING INCOME FOR BIODIVERSITY CONSERVATION

by

David N. Barton, Henrik Lindhjem, Irene Ring and Rui Santos

In this chapter we expand the analysis into a discussion of more novel financial mechanisms – i.e., mechanisms that have not been in much, if any, use so far in the area of biodiversity protection. This will concern solutions like PES procurement auctions, offsets/ habitat banking, and fiscal transfers. Examples of auctions of watershed protection contracts are pilot experiences from a small number of research projects in developed countries; habitat banking/offsets are found mostly in US wetland conservation; ecological fiscal transfer mechanisms financed using value added taxes have been tried in Brazil. Other types of ecological fiscal transfers have been tried out in Portugal and Germany. PES procurement auctions are primarily proposed to reduce the costs of achieving environmental objectives, potentially freeing up resources. Reforming environmentally harmful or otherwise ineffective subsidies which we also discuss in this part, is not a new approach as such, but is still a crucial component of any future mix of instruments to increase potential financing for conservation and create more appropriate incentives.

The extent to which these examples and specific experiences are transferable to other countries depends on the institutional setting in which the instruments were introduced. An analysis of whether they are generally applicable will mainly be based on theoretical reasoning and summary descriptions of the particular policy and development settings in which financial mechanisms have become a part of some countries' policymix. The literature reviewed for Part III is somewhat narrower than in Part II, stemming from consultancy reports and peer reviewed papers, mainly from the field of ecological and environmental economics. We try, however, to use the same set of criteria as used in that part.

Rui Santos is co-author of Section 2 and Irene Ring is lead author of Section 3 of this part of the report.

1. PES PROCUREMENT AUCTIONS

1.1 WHY AUCTIONS?

Auctions have been used by governments to trade a range of different commodities, including e.g. electricity, broadcast spectra, emission permits etc. Auctions come in many forms and the main idea is to harness market forces to induce participants in the auction, the bidders, to compete and through the bidding process, reveal their true valuation of the auctioned good. The underlying challenge for regulation, and the rationale for use of auctions in funding conservation, is that the landowner knows more about the on-site costs and local impacts of various activities than the conservation agency. This so-called asymmetric information gives rise to two problems normally termed hidden information ('adverse selection') and hidden action ('moral hazard') (Latacz-Lohmann and Schilizzi, 2005).

Hidden information may lead to a tendency where landowners who already are engaged in environmentally friendly practices and have low costs of additional such activities, enroll more often in PES programs. This may result in low environmental benefits (low additionality) and overcompensation of compliance or opportunity costs. Hidden action refers to the incentives contracted landowners have not to comply with the contract terms, if compliance monitoring is costly or difficult. Landowners can utilize their private information to extract so-called 'information rents' from the conservation agency, which implies higher costs to achieve a given environmental objective.

With the increased realization that funding for biodiversity conservation is far below what is required, auctions have increasingly been considered as the most promising mechanism to deal with the information asymmetries and increase cost-effectiveness of publicly managed PES programs.[29] Australia and the US are the pioneering countries testing auction designs in conservation and agri-environmental schemes (see e.g. Stoneham *et al.*, 2003).

1.2 TYPES OF AUCTIONS AND EXAMPLES

The two main forms of price setting in ordinary PES schemes to date are (1) bilateral bargaining between the conservation agency ('the buyer') with a single (or group of) landowner(s) ('the seller') where a price is agreed; and (2) posted fixed-price payment schemes. The latter is e.g. used in the Costa Rican PES scheme and in EU agri-environmental programs to support biodiversity (Rousseau and Moons, 2008).

[29] There are two other mechanisms discussed in the literature to deal with this problem. A coarse approach is collecting information about observable landowner attributes that are correlated with their opportunity costs and establish contract prices based on this (Ferraro 2008). Soil types, distance to roads and markets, forest types etc. are examples. The other mechanism is so-called "screening contracts", where different types of contracts are offered designed to fit with different types of landowners, i.e. so that low-cost landowners only will choose the low-payment contracts and high-cost landowners will choose the high-payment contracts ("reveal their type" through contract choice). Screening contracts are very rare in practice.

In a PES procurement auction, on the other hand, landowners are invited to submit bids (their required payment or compensation to enter into a PES contract) for delivery of the types of conservation activities the conservation agency has specified. Since the ecosystem service and biodiversity outputs are difficult to contract directly – cf. the discussions in Part I – the rewards are normally based on a specific set of activities, i.e. change of land management practices, rather than conservation outcomes (e.g. particular ecosystem services or biodiversity benefits). If these activities or practices are relatively homogenous, the conservation agency can rank bid proposals according to cost, and accept bids until the conservation budget is met. Alternatively, the conservation agency may have a target (e.g. number of hectares) to enroll and will accept bids until such a target is met. If the quality of ecosystem services vary among available land areas, not just the opportunity costs, the conservation agency typically ranks bids based on a combination of the (expected, proxied) environmental benefits and the payment levels (costs), e.g. in an index.

Two well-known auction schemes are the conservation reserve program (CRP) in the USA and the BushTender program in Australia. Descriptions of these auctions and how the auction schemes are organized, for example how they calculate the indices to rank bid proposals (see especially the CRP), are given in textbox III.1 and III.2.

The most common forms of bidding rules are the uniform and discriminative price auctions. In a uniform price auction the winning landowners are all paid the same price, typically the highest winning offer price or the lowest rejected offer. In the discriminative price auction each bidder rewarded a contract is offered their own winning offer bid. The main difference between these two auction formats is the impact on bidding behavior. In the uniform auction, the landowner has no incentive to make a bid above his opportunity cost, since what is paid is independent of the bid. However, the conservation agency will have to pay landowners a compensation which is higher than their revealed, true costs (since all landowners will get the same payment). On the other hand, in the discriminatory auction the conservation agency will pay only what the winning landowners bid, but the landowners have an incentive to inflate their bids since what they get depends on their bid. However, this comes at a cost which is the higher chance of not getting a contract. Hence, the auction mechanism will not be able to eliminate all information rents on parts of the landowners. We will discuss the implications of this for cost-effectiveness below.

Text Box III.1. US Conservation Reserve Program

Land retirement has in particular been important for the US agri-environmental policy. Traditionally, land was retired to improve crop prices or protect the soil, but from the early 1990s reducing environmental damage from agricultural production has come increasingly into focus. The Conservation Reserve Program (CRP) is the largest agri-environmental program in the US. It offers 10-15 year contracts for retirement of land from crop production. To be enrolled in the program land has to have a history of crop production, be highly erodible, and be located in a national or state Conservation Priority Area, or be devoted to wetland restoration, streamside buffers, or conservation buffers. In exchange for land retirement the land owners can receive cost-sharing for establishment of new cover (like grass or trees) on the land, and annual payments to compensate foregone profit and maintenance costs. Land owners who want to participate have to offer bids specifying the land they are willing to give up for retirement, what kind of cover they would establish, and what kind of compensation they will accept. The incoming bids are ranked using the Environmental Benefit Index

(cont.)

(EBI), which includes costs, and the highest scoring contracts are accepted. Prior to the early 1990s all bids under a pre-specified limit was accepted, but this practice has been abandoned to encourage farmers to bid against each other to reduce costs. The EBI factors used to rank bids are related to wildlife, water quality, erosion, enduring benefits, air quality and cost. Land owners may improve their EBI score and thus enhance their chances of being accepted into the program for example by asking for lower annual payments, forego cost-sharing, or establish cover that is more effective as wildlife habitat.

Table III.1 Factors generating points for the conservation reserve program's environmental benefit index

EBI factors	Definition	Features that increase points	Maximum points
Wildlife	Evaluates the expected wildlife benefits of the offer	- Diversity of grass/legumes - Use of native grasses - Tree planting - Wetlands restoration - Beneficial for threatened/endangered species - Complements wetland habitat	100
Water quality	Evaluates the potential surface and ground water impacts	- Located in ground-or-surface-water protection area - Potential for percolation of chemicals and the local population using groundwater - Potential for runoff to reach surface water and the population	100
Erosion	Evaluates soil erodibility	- Larger field-average erodibility index	100
Enduring benefits	Evaluates the likelihood for practices to remain	- Tree cover - Wetland restoration	50
Air quality	Evaluates gains from reduced dust	- Potential for dust to affect people - Soil vulnerability to wind erosion - Carbon sequestration	45
Cost	Evaluate cost of parcel	- Lower CRP payments - No government cost-share - Payment is below program's maximum acceptable for area and soil type	Varies, but commonly 150

Source: Claassen et al., (2008)

The U.S. Department of Agriculture offered a new general signup for the CRP in August 2010, the first since 2006.The details of the EBI calculations for the new program are given in USDA-FSA (2010).

Source: Adopted from Zandersen et al., (2009).

Text Box III.2. BushTender I & II, Australia

The BushTender was initiated by the Victoria government in Australia in 2001. The aim of the tender was to test whether auctions could efficiently purchase public environmental goods from private landholders. The good in question was biodiversity as captured through improved 'bush' management. 'Bush' in Australia refers to the original deep rooted ligneous vegetation prior to clearing and farming, which in agricultural areas survives today usually in isolated patches. Key issues in the initiative was to test how to ensure a sufficient number of landholders participating in the tender and whether an auction could be more cost-effective, budget wise, than a traditional fixed price payment scheme.

Under the BushTender, micro-regions were designated and a budget of A$ 400,000 was allocated in the first round and A$ 800,000 in the second round. Expressions of interests were called for and government officers subsequently visited the farms and the proposed land areas up for tender. Ecological data was collected from the sites to construct a spatially specific biodiversity benefits index, defining a benefit to cost ratio for the government. Contracts were negotiated on a one-to-one basis whereby a land management plan would be set up as a proxy for payment of the ecosystem services. Contract durations were set at 3 years in round 1 and 6 years in round 2. A sealed-bid discriminatory price auction was used to 'reveal' the price of the farmers for providing their pre-negotiated services. Bids were ranked according to the biodiversity benefits index until the budget constraint was hit.

Lessons learnt from the auction were generally positive. The government found that auctions work and contracts are allocated, whereby the marginal cost curve information is revealed and they show improved cost-effectiveness over fixed pricing schemes. The government found that revealing all information on e.g. the biodiversity benefits index to the farmers is best despite the risk of collusion, which they also found was a non-issue. In addition, the government found that auctions are popular with landholders as biodiversity is translated from a complex idea to practical actions. A total of 300 contracts were allotted (Latacz-Lohman and Schilizzi, 2005).

Source: Adapted from Zandersen et al., (2009).

Auctions contain many other design elements than those explained above that may potentially influence bidding behavior and the assessment of auctions as a suitable instrument along our four criteria: process legitimacy, effectiveness, efficiency and equity. We will not go into these design elements in detail but some that may potentially be important for conservation auctions are: whether the conservation agency sets a reserve price[30]; the bid evaluation system; potential for incorporating site synergies; how much information should be given to prospective bidders; whether bids are allowed to be revised and whether auctions are repeated over time (which is typically the case for many conservation auctions in practice). The theory and experience of conservation auctions are relatively immature (Ferraro, 2008). Most of the focus to date has been on estimating potential cost savings of auctions compared to fixed price schemes. Since PES procurement auctions are an alternative to such fixed price PES schemes (as discussed in section 2 in Part II), we emphasize below differences involved in using auctions.

[30] An upper limit on the amount of the agency is willing to pay for a unit of the conservation good.

1.3 PROCESS LEGITIMACY

In the rapid literature review we have done for this assessment, we have found no studies investigating process legitimacy of auctions over fixed-price or bilaterally negotiated PES contract schemes. It is impossible to make general judgments of process legitimacy of auctions vs. standard PES schemes, as this is likely to depend very much on the local context and the specific type of auction design. However, we mention a few important and general auction design issues here that may be of importance for how actors judge the degree of process legitimacy.

First of all, most if not all conservation auctions to date have been organized by a public entity, leaving most of the decisions and judgments to this entity. For private actors to run an auction it would require a cap on environmentally harmful activities, which could give private actors an incentive to reach the cap at lowest cost through an auction mechanism (see discussion in Part I and the section on habitat banking below). The alternative would be for private actors to be voluntarily involved in auctions. To our knowledge privately organized auctions for conservation contracts have not yet been used, likely since it is just government entities that are willing to be the buyer of conservation contracts. Hence, the rights structure underlying most current auctions reflects that the landowners have the right to the current level of deterioration and will get compensated to provide environmental benefits beyond this level (see Part I).

Decisions of eligibility to participate, the information given to bidders, bid evaluation system and how environmental benefits are weighted and scored compared to costs, bidding rules and how many bidders are finally given contracts are all design elements that may be more or less transparent and judged as more or less fair and accountable by different stakeholder depending on the situation. For example, the decision to differentiate bid prices using a discriminatory auction may be rendered suspect and prone to corruption compared to a uniform price auction, if the criteria under which price differentiation have been decided are not transparent. The choice of bidding rules is also important for equity considerations (see below). Another example of a design element of importance for process legitimacy is given by Cummings et al., (2004): If landowners are allowed to revise their bid during the auction process to reduce the chance of poor choices, the likelihood that landowners will be angry about the auction process may be reduced.

Many of the design elements we mention also have more or less clear implications for cost-effectiveness and efficiency of the auction, and it is likely here as in the choice of other policy instruments, that there will be trade-offs between different criteria. For example, although it may be desirable for process legitimacy to give as much information as possible about an auction process, this information may be used by landowners to extract information rents and thereby reduce the cost-effectiveness of the auction mechanism, especially in auction processes that are repeated (Latacz-Lohmann and Schilizzi, 2005). Further, if sophisticated bid evaluation methods are used to combine environmental benefits and costs, this process may be perceived as a ‘black box’, is harder to explain to bidders and generally less transparent than other pricing schemes. Such evaluation processes are also by necessity subjective and may be more prone to manipulation and rent extraction by officials.

Another issue that Latacz-Lohmann and Schilizzi mention that may be potentially important for process legitimacy is whether the contract is based on input activities or environmental outcomes. If the contract is based on outcomes, land owners take all the risk to ensure such outcomes are achieved. If they are hard to observe or measure, there may be high risk of disputes (e.g. litigation) linked to unclear landowner responsibility.

1.4 EFFECTIVENESS AND EFFICIENCY

The main question related to *effectiveness* in this case is whether auctions can deliver reduced biodiversity and ecosystem service loss over the more standard PES-schemes. As with auctions, standard PES schemes are subject to hidden action problems, i.e. that the landowners have an incentive to cheat on their contract obligations resulting in lower-than expected environmental benefits. The conservation auction literature is not well-developed to deal with this problem. The most important policy conclusions in this literature are derived from theory and simulations. According to Latacz-Lohmann and Schilizzi (2005) the incentives to cheat are expected to be highest when landowners' compliance (opportunity) costs are high in relation to the payment levels (and the detection probability and fine in case of non-compliance detection are both low). This means that overcompensation may reduce the risk of non-compliance (and therefore the need to monitor) and that monitoring efforts should be concentrated on the high-cost landowners. These are the landowners with high pre-contractual land-use intensities.

The impact on effectiveness of auctions compared to fixed-price PES schemes is hard to judge on this point, as auctions typically contract more high-cost, high environmental benefit landowners who also have a higher risk of non-compliance. If monitoring for these landowners is not increased, some of the additional environmental benefits may not be realized compared to a fixed-price PES scheme. However, as argued by several authors, the chance of achieving additionality should be higher overall with the use of an auction (Ferraro, 2008). That is because paying low-cost landowners less through an auction frees up resources to pay high-cost landowners, who are much more likely to provide a (much) lower level of ecosystem services in the absence of a PES contract. This is a potentially important point, given the low additionality observed for example for parts of the Costa Rican PES scheme (see Part II of the report).

Auctions may also be more targeted to take account of the heterogeneity of ecosystem services over the landscape, not just variations in opportunity costs. This may be done by separating auctions with groups of landowners that are relatively homogenous in the services they supply or by scoring environmental benefits using some form of index, as in the CRP scheme. This brings us back to the problem of how to value or weight environmental benefits. However, even some form of consideration or weighting of environmental benefits may yield significant efficiency and environmental improvements over auctions that only consider the heterogeneity in costs (Claassen *et al.*, 2008; Connor *et al.*, 2008). Auctions may also be designed to encourage bids (and higher payments) for land areas that are contiguous, giving higher environmental benefits than similar-sized plots away from each other (Reeson, forthcoming). However, auction design must carefully consider the risk of so-called collusion and strategic bidding among landowners which will reduce cost-effectiveness. Concentrating contracts in one geographic area may also

reduce monitoring costs, and in some cases landowners may influence each other positively, reducing the likelihood of breaching contract obligations.

Whether contracts are based on inputs (e.g. prescribed management activities) or outcomes (i.e. some measureable part of the final ecosystem service or biodiversity change) – or a combination of the two – is important for effectiveness. If the contracts are based on input activities only with no reference to achieved outcomes, landowners will have no incentive to make sure the outcomes are achieved or for entrepreneurship, e.g. providing biodiversity habitat more cheaply.

We will briefly discuss other aspects of effectiveness, e.g. the risk of corruption, in the final section below.

The main issue analyzed in the literature is the potential cost savings of auctions compared to standard fixed-price PES schemes, i.e. *cost effectiveness*. The general view in the literature based on actual experience and model simulations is that auctions may reduce costs of reaching environmental objectives substantially compared to fixed-price PES arrangements (Ferraro, 2008; Rolfe and Windle, 2008; Windle and Rolfe, 2008). It varies whether these studies incorporate some measure of administrative or transaction costs. Auctions seem to work best when there are many bidders, contracts are fairly homogenous in the ecosystem services or input activities, and landowners are heterogeneous in their opportunity or compliance costs (Latacz-Lohmann and Schilizzi, 2005).

Latacz-Lohmann and Schilizzi (2005) recommend using a discriminatory bidding rule rather than a uniform one for conservation auctions if there are no clear reasons to think that bidders will grossly inflate their bids over opportunity costs. If the landowners are risk-averse and prefer a certain income from a PES contract over more uncertain alternatives, the discriminatory format may clearly be preferable to the uniform format. This is because land owners would tend to bid less as they also value a more secure income. Note also that a uniform pricing is likely to give lower overall payments than a fixed-price scheme for the same environmental target.

A final issue we will discuss regarding cost-effectiveness is the role of information and learning. Although many studies show large efficiency gains of auctions over fixed-price schemes, these studies have typically assessed one-shot auctions. More recent studies show that if landowners learn from previous auctions or get information for example about the specific preferences of the conservation agency or their maximum reserve price, these efficiency gains may be greatly reduced over time (and space) as landowners adjust their bids upwards (Schilizzi and Latacz-Lohmann, 2007). As mentioned, in this regard information sharing to achieve higher legitimacy may have to be traded off with increased cost-effectiveness.

Regarding *transaction costs* of auctions, few studies investigate this issue explicitly. Auctions can be complex and difficult to implement and therefore imply transaction and administrative costs that are higher than fixed-price schemes (e.g. Connor et al., 2008). However, Ferraro (2008) argues that auctions may not be more complex than individually negotiating with landowners, which some countries do. Using differentiated payments, e.g. as a result of a discriminatory price auction, may in turn be more administratively costly than a uniform price auction. It would also involve potentially higher transaction costs to attempt environmental

outcome-based contracts (Latacz-Lohmann and Schilizzi, 2005) or environmentally heterogeneous auctions where benefits need to be weighted. As mentioned above, environmental outcome based auctions may lead to litigation and conflict as landowner responsibilities, for example in case of a forest fire, pest or similar, may be less clear.

1.5 EQUITY

As we have seen, auctions may take many forms and the outcomes will depend on the specific design of the auction. Compared to a fixed-price PES scheme, payments will generally be made to fewer landowners, a larger percentage of who are high-cost (and high environmental benefit). This may have equity and poverty impacts, if low-cost landowners are more likely to be poor. Further, in some countries it may be considered more equitable to make differentiated payments that reflect opportunity costs, rather than uniform payments to all landowners. However, in developing country contexts, uniform payments are likely to be seen as more fair (Ferraro 2008). It may not be regarded as fair, that those who have demonstrated environmentally friendly behavior in the past and therefore may have lower opportunity costs are 'punished' for that with lower payments. This has been a key issue in the debate about REDD. As many PES schemes in reality have both poverty alleviation and conservation objectives, there may be additional trade-offs between equity and efficiency for PES auctions in such contexts.

1.6 CONCLUSIONS AND TRANSFERABILITY TO DEVELOPING COUNTRY CONTEXTS

Conservation auctions are still in their infancy, even in industrial countries, though the interest and experience are growing fast. Auctions can potentially save substantial costs to reach environmental objectives compared to fixed-price PES schemes or individually negotiated PES-contracts when there are many bidding landowners (encouraging competition), contracts are fairly homogenous in the ecosystem services or input activities, and landowners are heterogeneous in their opportunity or compliance costs. However, the complete transaction costs have rarely been calculated comprehensively in practical auction applications.

While auctions are institutionally, technically and informationally relatively demanding to organize, they may still be feasible in low and middle-income countries, as many of these countries already have relevant experience e.g. from relatively simpler timber and forest product auctions (Ferraro 2008). However, there are practical differences between very low income countries, where the conservation agency will have to contract with landowners that are very poor, semi- or illiterate, without formal land title and dispersed over remote, rural areas. Auctions will be practically and institutionally easier for a mid-income country such has Costa Rica.

Ferraro (2008) points out that the use of differentiated payments may provide opportunities for private gain and corrupt activities such as bid rigging, potentially reducing the effectiveness of auctions as an instrument to achieve higher biodiversity gains at lower costs. This will be a more serious problem in low income countries.

Finally, Latacz-Lohmann and Schilizzi (2005) warn in their review of the suitability of using auctions in Scottish agri-environment PES schemes that auctions due to their complexity (and often unpredictable outcomes) may have a higher risk of failure than a fixed-price scheme. Hence, more testing is likely to be required before conservation auctions are rolled out, especially in developing country contexts.

2. TRADABLE DEVELOPMENT RIGHT AND HABITAT BANKING WITH BIODIVERSITY OFFSETS

The discussion of habitat banking with tradable development rights and biodiversity offsets draws mainly on a review conducted by the POLICYMIX project[31] (Santos *et al.*, 2011a)[32]. In addition, we have reviewed findings from regional reviews for Latin America and the EU (Bovarnick *et al.*, 2010; EFTEC *et al.*, 2010), business manuals (BBOP, 2009), and some peer reviewed literature (Karsenty, 2007; Benayas *et al.*, 2009; Hartig and Drechsler, 2009, 2010). In depth case studies of existing biodiversity offset schemes are available as appendices to EFTEC et al., (2010). Bovarnick et al., (2010) conduct a feasibility assessment of habitat banking for selected countries in Latin America which are available as appendices to their main report.

In this chapter we discuss the difference between tradable development rights (TDR) and habitat banking with biodiversity offsets, consisting crucially of whether a development cap or conservation objective is the object of the trades/offsets. Biodiversity offsetting does not require trading, and can be based on a pure command and control approach (obligation to compensate under environmental liability either on- or off-site). Habitat banking is a particular case of biodiversity offsets, introduction a trading element for offset actions (credits) that are delinked both in space and time from the specific development requiring compensation (debits). Both TDR and biodiversity offsets are created by legal imposition of either development cap/zoning requirements (TDR) or environmental liability/protection legislation requiring off-setting of residual impacts of development, respectively. In practice, legislation mandating biodiversity offsets has been harder to implement with biodiversity offset and banking characterized more as 'pilot' or 'voluntary' projects (see e.g. French and Australian case studies, EFTEC et al. 2010).

Trading is the basic feature associated with both TDR and habitat banking (market-based instruments): in one case trading 'development units/rights' in the other trading 'conservation/ habitat units/areas'. The essential difference is the definition of what is traded, and the information required to achieve equivalence between the sites involved in the trade. On the one

[31] http://policymix.nina.no.

[32] Santos and colleagues review biodiversity offsets, tradable development permits and habitat banking for biodiversity conservation. Although the specific purpose of their review is to assess the complementarities of offsets, permits and banking relative to other instruments in the conservation POLICYMIX, we use their review as a starting point for our own discussion. They follow a similar evaluation format to the present report, first reviewing process related issues of governance levels and actors involved, setting the baseline for offsets, monitoring and evaluation; experiences with policy outcomes criteria, namely effectiveness, cost-effectiveness, social impacts and institutional and legal requirements.

hand, TDRs do not require an environmental mitigation hierarchy to be implemented, and trade in an observable proxy of the quality of development (e.g. infrastructure density). On the other hand, habitat banking with biodiversity offsets bases the trade on habitat quality as a proxy indicator for biodiversity; conditioned by legal requirements to carry out as much mitigation of development as possible at the development site. While trading is a superficially similar characteristic, there are large differences in principle between how policy effectiveness is defined and the potential transaction costs of achieving development versus conservation policy targets.

We focus our review on some assumptions made by studies regarding the trade-offs between effectiveness, costs and equity.

2.1 DEFINING CHARACTERISTICS OF TRADABLE DEVELOPMENT RIGHT AND HABITAT BANKING WITH BIODIVERSITY OFFSETS

Tradable development rights (TDR) rely on a cap of the total amount of development allowed in an area identified for its conservation value (EFTEC et al., 2010). According to EFTEC (2010: 43) "TDR programmes separate out the right to develop land from other rights such as use and lease. As the right to develop land is sold, that parcel of land becomes protected from development, often as a conservation easement. The parcel of land that the rights are transferred to is then allowed to develop, in some cases to a higher degree than normally would be allowed by standing planning permission." An example is Brazil's Forest Code requirement of 20% set aside of land in legal reserves (35% in the Amazonian cerrado habitat, 80% in the legally defined forested Amazon). Slightly confusing is that 'offsets' is also used in the literature when explaining the compensation requirement in Brazil's Forest Code (EFTEC 2010, appendix). The difference in TDRs and habitat banking with biodiversity offsets is explained below.

TDR is a way of encouraging the reduction of development in areas that should be protected ('sending zone') and increasing development in predicted growth areas ('receiving zones') (Pruetz, 2003). Demand for TDR's is created by regulation of a cap on development or a minimum reserve requirement (Figure III.1). It is also a pre-condition for a market that there is a difference in the opportunity costs between the location seeking to purchase the TDR (A) and the off-set site (B). We return to other preconditions in our discussion below. Experiences with TDRs can be found in countries such as the USA and Brazil where property rights have been defined as a bundle instead of a single right (EFTEC et al., 2010). Where public money is used to purchase rights, rather than the purchase occurring between private developers and conservation, this is referred to in the USA as Purchase of Development Rights (PDR).

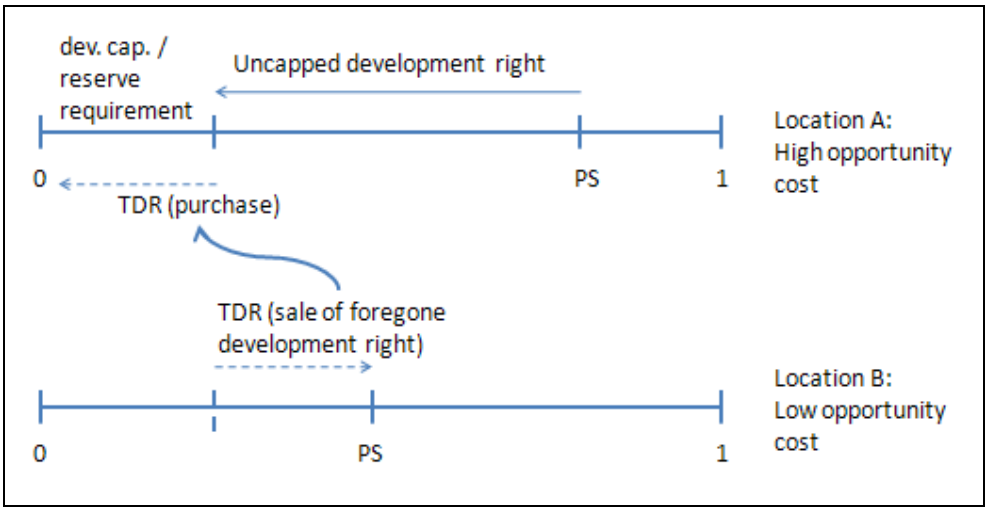

Figure III.1. Tradable development right approach. PS=present status. Owner of location B ('sending zone') relinquishes her right to develop land, selling it to offset landowners A's ('receiving zone) liability in exceeding a development cap.

The terms-of-trade reflect both the polluter pays principle (PPP) on the part of the developers liability (in the form of PPP2 as defined in Part I), and the provider gets principle (PGP2), on the part of the rehabilitating landowner – tradable development rights refer to the rights a landowner (B) has above the development cap to place her land in a conservation easement, which is then sold to offset the liability of a developer (A) who exceeds a development cap.

Biodiversity offsets are defined by the Business and Biodiversity Offsets Programme (BBOP, 2009:6) as "measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development and persisting after appropriate prevention and mitigation measures have been implemented. The goal of biodiversity offsets is to achieve no net loss, or preferably a net gain, of biodiversity on the ground with respect to species composition, habitat structure and ecosystem services, including livelihood aspects".

Biodiversity off-sets are defined by environmental liability of development (Figure III.2). A developer's initial project plans may entail environmental liability being subject to a mitigation plan following an Environmental Impact Assessment (EFTEC 2010, BBOP 2009). The mitigation hierarchy regards biodiversity off-sets as a measure 'of last resort' after having taken prior mitigation steps to 1. avoid; 2. minimize; and 3. mitigate impacts on-site. Off-sets are meant to compensate for the residual on-site impact after these measures have been implemented.

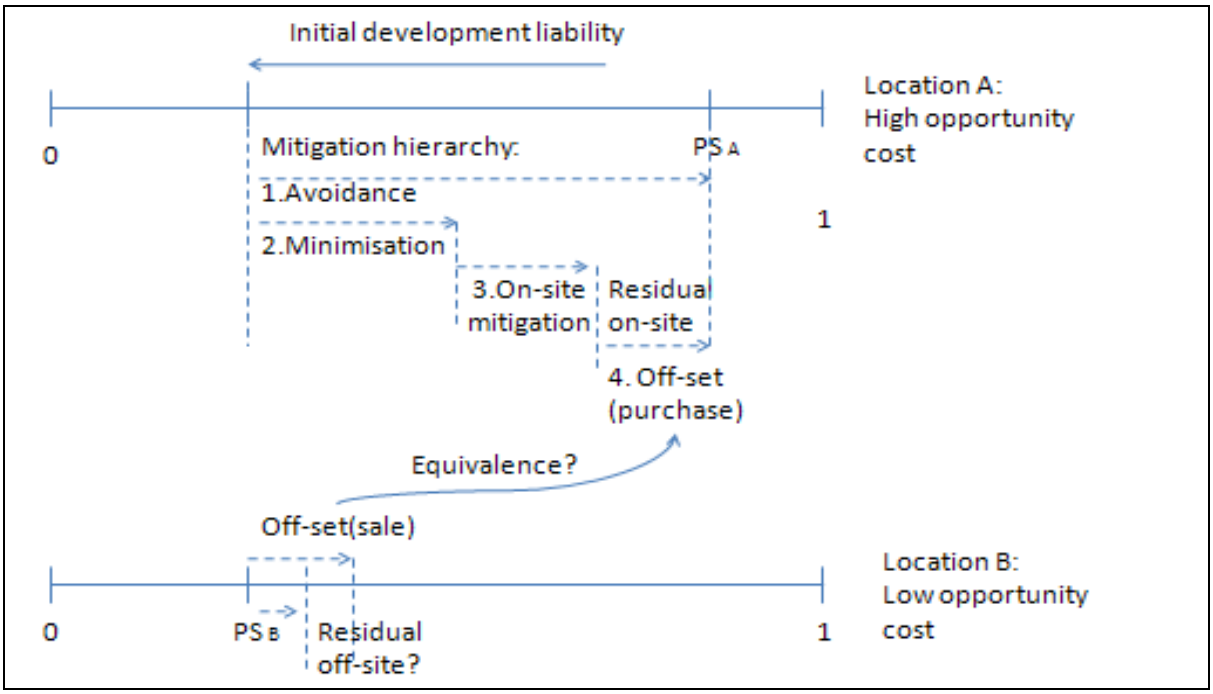

Figure III.2 Biodiversity off-set concept and issues.

'Residual on-site' refers to unmitigated development which requires a purchase of an off-set to achieve 'no net loss'. 'Residual off-site' refers to the possibility that the off-set credit sold from rehabilitation off-site may not actually achieve the contracted off-set because of ineffective rehabilitation. Equivalence also refers to similarity of habitats' composition, structure, and function their ecosystem services

In figure III.2 off-sets are purchased by site A developer either directly, or through a habitat banking arrangement, from a site B where a habitat restoration activity is undertaken, starting from the present status (PS), that aims at creating equivalent habitat to that lost. The land under habitat restoration at site B is placed in a conservation easement to ensure its future protection.

The equivalence of rehabilitation is key to the effectiveness of off-sets in attaining a 'no net loss' target. If more off-sets or off-sets of a better habitat quality are purchased this is termed 'trading up' (EFTEC et al., 2010). On the other hand, lacking enforcement at the rehabilitated site B can lead to less than equivalent rehabilitation, in which case the residual biodiversity impact of the development activity is effectively 'exported' off-site (Figure III.2). A clear definition of residual biodiversity loss requires that developers' obligations and liability under a mitigation hierarchy are clearly defined, understood and enforced. The effectiveness of biodiversity off-sets relies on equivalency of credits between habitat types and on enforcement of biodiversity protection.

Habitat banking is also referred to as *biodiversity trading*, *biodiversity banking* and *conservation banking* in the literature. Habitat banking is defined by EFTEC et al., (2010:62) as "a market where credits from actions with beneficial biodiversity outcomes can be purchased to offset the debit from environmental damage. Credits can be produced in advance of and without ex-ante links to, the debits they compensate for, and stored over time". The 'banking' aspect relates

specifically to biodiversity off-sets being stored and unrelated *ex ante* to the development creating the debits. By decoupling the development activity from the off-setting activity, habitat banking holds out the prospect of matching low cost land for rehabilitation to high value land for development. However, the decoupling in time of the compensating action by using a habitat bank emphasizes further questions regarding habitat equivalence between credit and debit activities at different sites.

2.2 Policy and design issues

Although the definition of habitat banking can be applied to TDRs, we find most examples of habitat banking in the literature referring to biodiversity offsets (EFTEC 2010 appendix): most states in Australia have introduced some form of banking with biodiversity offsets, such as 'native vegetation offsets' in the state of Victoria sold through a government regulated trading system called 'Bushbroker'; New South Wales has regulations allowing mitigation banking through its 'Biobanking' scheme; South Africa has a wetlands mitigation banking system; USA has wetlands mitigation banks and conservation banks, the latter striving to mitigate adverse development effects on species listed as threatened or endangered under the Endangered Species Act; Canada's Fisheries Act requires compensation for lost fish habitat prior to the development of a project, often used in situations where a developer needs to compensate for several small harmful alternations, disruptions or destructions, but there are few on site compensation options.

It has been argued that development rights and biodiversity off-sets in habitat banking schemes are expected to perform better than landscape zoning without habitat banking in terms of cost-effectiveness and private actor engagement (Santos et al., 2011a). Extensive review of the conditions under which habitat banking is both feasible and effective was conducted by EFTEC et al., (2010). They list the potential major benefits from habitat banking (p.5 Executive Sum.):

- More effective, and in some cases ex-ante (and therefore more reliable), delivery of existing biodiversity policy objectives and of compensation requirements;
- Greater impacts and increased long-term viability of large-scale measures (also potentially from pooled offsets);
- Reduced habitat fragmentation from strategic and selective placement of compensation measures (e.g. to link up, increase the size of, or buffer Natura 2000 sites);
- The option to trade up measures to address higher conservation priorities, and
- The opportunity to efficiently address cumulative impacts from small-scale or low impact developments for which there is no legal requirement for compensation.

The listed benefits of habitat banking are relative to other market-based instruments – rather than a status quo without habitat banking (and based largely on regulation). The analytical starting point of the EFTEC analysis would seem to be that a decision on some kind of market-based instrument has been taken. On the contrary, we argue below that an analysis relative to a status quo, or alternatives based largely on regulation is missing. We also argue that conclusions regarding feasibility of habitat banking have been made assuming that an effective scheme can be designed. There is reason to question such an assumption. Recent reviews of mitigation banking schemes have shown high rates of non-compliance with agreed conditions (Gibbons and

Lindenmayer, 2007 in Santos et al., 2010a). A review of rehabilitation projects from around the world also concluded that rehabilitation projects fell well short of reference ex ante levels of biodiversity (Benayas et al., 2009). In the next sections we look at some explanations.

2.3 LEGITIMACY OF THE POLICY PROCESS IN ESTABLISHING HABITAT BANKING

Legitimacy of the process concerns how decisions are made, who participates and under what conditions. Part II discussed the legitimacy of market versus public governance in the context of PES as a conservation instrument. In the rapid literature review we have done for this assessment, we have found no studies investigating process legitimacy of habitat banking over other market mechanisms. It is difficult to make general judgments of process legitimacy of habitat banking or TDR versus other instruments, as this is likely to depend very much on the local context. Here we discuss how habitat banking, while a market mechanism, relies on public governance to create market-demand by defining rights, monitoring and enforcing compliance of the terms of mitigating and offsetting habitat loss.

Setting development caps, biodiversity conservation targets and environmental liability levels are political decisions and keys to establishing markets for habitat banking. Demand for off-sets comes from the business sector interested in development of natural areas, but is caused by the cap set by the policy process. Politically complex, translating international targets to national/regional/local level conservation objectives is steeped in politics, but also essential to local habitat banking markets. The main constraint on habitat banking in countries such as France is the absence of standards at the national level (CDC Biodiversité 2010 in Santos et al., 2011a). In the EU, the feasibility of habitat banking within member states rests on policy reforms in these states to implement the EU's 2020 Biodiversity Strategy objective of 'no net loss' of biodiversity. In another example from Brazil, the feasibility of a tradable development rights scheme rests on the definition of the percentage of land in legal reserves required of landowners in the presently disputed Codigo Floresta. Here, individual states also have autonomy in defining how the cap is to be implemented (EFTEC 2010, appendix pp. 111-129).

While the focus on the literature is on equivalence and the effectiveness of the biodiversity off-sets *off-site* (location B in Figure III.2), there is an incentive *on-site* to increase what is unremediable 'residual biodiversity loss'. With lacking enforcement developers have an incentive to substitute more expensive on-site minimization and mitigation measures for cheaper off-site biodiversity off-sets. Where this happens it could damage the legitimacy of habitat banking. Habitat banking therefore relies on political support for strengthening *enforcement of the 'mitigation hierarchy'* following from Environmental Liability and SEA.

The potential size of the market for habitat banking is a political question of the definition of rights and responsibilities of public and private actors, defined by environmental liability and requirements of compensatory measures. EFTEC et al. (see previous comment), (2010) conduct an extensive review of legislative basis for habitat banking in the EU Habitats Directive and the Environmental Liability Directive. They conclude that with current EU legislation the potential

for habitat banking in Member States is small, but potentially large for 'less protected' and 'widespread' habitat types (Figure III.3).

	I. Critical	II. Strictly protected (A)	III. Less protected (B)	IV. Widespread (C)
Legal status	EU Laws & Directives		National policy priorities	Limited
Compensation driver	- n/a	Habitats & other Directives - Guidance	Weak - planning laws	None
			***New mechanism* required to ensure no net loss**	
Potential market	None for debits	Small	Currently small, but potentially large	
Equivalence approach?	-	Detailed, case by case		Simple checklist, possible fee
Equivalence like for like?	Trading up to credits	Strict	Strong	Weaker (trade up)
		No substitution	of damage	to lower categories
	Trading up	allowed/encouraged	from lower categories	

Figure III.3 Different aspects of habitat banking according to conservation status of the biodiversity involved (Source: EFTEC et al., 2010)

While Figure III.3 illustrates that the potential for a large habitat banking market is only for less protected and widespread habitats, these also provide the least valuable biodiversity off-sets in terms of habitat value. The EU Habitats Directive regulates the use of protected areas in the Natura 2000 network. None of the reviews of habitat banking we have looked at conclude that protected areas should be opened for generating off-sets. Nevertheless the Habitats Directive is currently seen as an obstacle to expanding off-sets to strictly protected areas. EFTEC et al's. (2010:199) legal evaluation illustrates this motivation "[..] the European Commission makes clear that compensatory measures should have a strict connection with the affected habitat type and its functions. It is this requirement that in our view poses the largest obstacle to habitat banking. The question arises how to circumvent this obstacle". It is further noted that "In order to use habitat banking as an alternative to the compensation measures that have to be taken on the basis of Article 6(4), we consider adjusting the Habitats Directive as necessary, especially *when the aim is to use habitat banking on a large scale* " (op.cit. p. 127).

As the last quote would seem to indicate, there is a danger that implementation of market-based instruments in conservation policy is taken as the policy aim in itself, rather than a cost-effective

means of attaining conservation aims. Where this is the case there is an incentive for off-set brokers and developers to push for less strict compensation requirements.

We now turn to arguments relating to the evaluation criteria of effectiveness, costs and social impacts of habitat banking.

2.4 LEGITIMACY OF OUTCOMES

The main aim of this section is to illustrate how several key design aspects of habitat banking involve hard trade-offs between evaluation criteria.

2.4.1 Effectiveness and efficiency

As defined in part I *effectiveness* concerns the capacity of habitat banking to deliver reduced biodiversity loss and the capacity to ensure additionality and permanence and avoid leakage. Implicit is also how the system influences motivation – including the risk of corruption.

Costs include the opportunity costs of foregone development income due to conserving the sites, and transaction costs of ensuring effectiveness of caps and mitigation measures on the development site, and off-setting compliance at the rehabilitation site. Transaction costs are also involved in establishing the regulatory conditions for trading in habitat banking.

Efficiency is defined as achieving the highest effectiveness at the least cost (independently of a target). A related concept is cost-effectiveness, which means achieving a set target at least cost. Cost-effectiveness is the most relevant for our discussion when conservation targets (such as 'no net loss') are explicit. We also discuss effectiveness and efficiency/costs together as they are in many instances correlated with each other. In evaluating cost-effectiveness of habitat banking we would argue that much of the review literature makes claims regarding based on theoretical expectations, and not in relation to any particular alternative market-based instrument, let alone a reference situation not involving market-based instruments. For an example see Table III.2 (EFTEC et al., 2010)

Table III.2 A comparison of habitat banking and other market based instruments. EFTEC et al., (2010:4) writes "This favourable comparison [of habitat banking to other MBIs] is contingent on it being possible to design an efficient system, which balances regulatory controls of risks with freedom for the market to operate." In other words, the conclusions of greater cost-effectiveness of habitat banking are based on an assumption of efficient design! Our approach in this chapter is limited to a discussion of design issues, unfortunately with little empirical evidence to draw on. From the list of issues discussed in Santos et al., (2011a) we have selected some particularly difficult trade-offs that must be considered in finding the balance between costs and effectiveness of habitat banking[33].

[33] What is cost-effectiveness of habitat banking to society? Cost-effectiveness is a ratio of effectiveness in achieving a "no net loss" target relative to social costs of establishing the system. Effectiveness can be represented by the net gain in habitat area (A) and quality (Q) summing across at the rehabilitation site (b) and the development site (a). Costs include the additional transaction costs (TC) of complying with the conditions of the biodiversity off-sets credit at both locations a and b. There are also information costs (i) of habitat bankers identifying owners with

Table 2.1: Comparison of habitat banking to other relevant market based instruments

Instrument			Economic Rationale			Environmental Effectiveness	
Type	**Theory**	**Practical Issues**	**Burden**	**Gain**	**Efficiency**	**Effect**	**Long-term**
Habitat banking Features	• Polluter pays • Can deliver fixed policy objective (e.g. no net loss), but cost (price) can fluctuate.	• Careful design of system essential, especially rules on equivalence, monitoring and evaluation • Over designed market may not function	• Private finance • Successfully implements polluter pays • Risk of non-additional actions	• Avoid biodiversity loss • Possibilities for Trading up[11] or other strategic objectives	• Economies of scale at several stages of compensation • Potential financial and ecological benefits • Reduced transactions costs	• No net loss • Potential for net gain • Incentive to conserve biodiversity • Difficult to assess for long-term credits	• Direct resources to conservation priorities (e.g. valuable habitat or climate change adaptation)
Comparison of habitat banking (HB) to other MBIs	Favourable HB has fixed objectives (NNL), but price fluctuates - appropriate to heterogeneous resource like biodiversity and thus likely more efficient for biodiversity than a tax-based solution.	Acceptable • Potential problems shared by HB and other instruments targeted at biodiversity	Favourable • No additional cost to public sector (other than regulatory costs, which can be recovered from HB providers). • Minimal deadweight loss • Competition minimises prices	Favourable • HB gives individuals incentive to go beyond minimum compensation requirements • Design for biodiversity policy needs possible.	Acceptable • HB creates market incentives at several stages of biodiversity conservation process • Detailed design and oversight may raise transactions costs.	Favourable • Potentially creates efficient system for delivering compensation requirements • Environmental outcome fixed at baseline (no net loss) (in theory)	Favourable • Mechanisms to ensure permanence can be built into system • Unclear incentives for long term monitoring

Source: EFTEC et al., (2010)

In the next section we discuss how achieving habitat equivalence is constrained by available habitat for offsets, differences in opportunity costs between sites, private motivations to substitute away from the costly like-for-like habitat offsets, and the transaction costs of the regulator in trying to guarantee that offsetting actually happens and 'no net loss' conservation targets achieved. We divide our discussion into four main issues (i) 'Like for like' – quality and substitution (ii) opportunity costs, (iii) Transaction costs and (iii) Motivational aspects

(i) 'Like for like' – quality and substitution

Achieving habitat equivalence between developed areas and offset areas is synonymous with the conservation effectiveness of habitat banking and TDRs.

Piecemeal versus functional conservation. If large contiguous areas of unrehabilitated land are not available next to existing intact habitats, and/or landowners there are not interested in giving up their development rights, a piecemeal rehabilitation of habitat 'islands' could result, and the potential for habitat banking to agglomerate rehabilitation and establish ecologically functional habitats will not be achieved. Conservation markets that consider connectivity lead to considerably better conservation results than markets without spatial incentives (Hartig and Drechsler,

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rehabilitation locations and buyers among developers. If the analysis is to be complete, a share of the transaction costs should be charged to each off-set trade (T) for setting up the regulatory conditions for habitat banking market (TCm). We must subtract the benefits (cost savings) of the trade which are the difference in the opportunity costs (OC) between the rehabilitation location (b) with lower opportunity costs and the development location (a) with higher costs.

$(Ab*Qb + Aa*Qa) \; / \; [(TCa - TCb - TCi - TCm/T) - (OCb - OCa)]$ Eq. 1

2009). Through accumulation of off-sets habitat banking can then target these at connecting habitat and increasing the scale of conservation efforts. While this is a prerequisite of effectiveness for habitat banking, targeting is not a feature unique to habitat banking. Other instruments such as PES can be targeted at priority areas, and connectivity encouraged through the use of agglomeration bonuses.

Trade-off between area and quality equivalence, complex assessment and transaction costs. There is also a trade-off between quality and quantity measures of equivalence. "Complex trading schemes, with individual assessment of rehabilitation sites were found to have substantially lower numbers of transactions, programme participation and hence conservation effect" (Santos et al., 2011a:76). The conservation effect in this quote is measured in terms of number of trades, and presumably area of habitat restoration. There is no evidence as of yet to assess whether the complex trading schemes, through more costly individual evaluation, achieve higher quality of habitat restoration.

Available land, extent of market, equivalence and erosion of conservation targets. Some habitat types and potential restoration locations may become so scarce due to development - e.g. coastal wetlands - that like-for-like off-sets cannot be supplied. Habitats are either developed or already protected by conservation easements. In order to allow further development of coastal wetland sites, alternative off-set sites need to be found in other environments (e.g. inland wetlands). This may lead to pressure from developers and brokers to shift an off-set system from a 'like-for-like' habitat equivalence, to off-setting an increasingly limited set of identifiable ecosystem services in increasingly more distant and ecologically dissimilar habitats (Text Box III.3). Scarcity in available off-set sites is seen as a real possibility within the EU (EFTEC et al., 2010). High offset ratios implemented over several decades in a specific landscape are needed to avoid net losses of biodiversity in specific landscapes under a habitat banking scheme (EFTEC et al., 2010). However, limited available rehabilitation sites limit the possibility to use higher compensation ratios to address just such risks and erosion of like-for-like habitat equivalence. Furthermore, a decadal planning horizon would require a strong involvement of a regulator in how and where habitat banks allocated offsets.

Text Box III.3 Equivalence - like-for-like habitat and species-for-species offsets

US regulation on wetland and conservation banking provide an illustration of how equivalence can be implemented in a banking scheme. Equivalence in *wetlands banking* concerns what metric should be used to measure the loss and gain to wetlands or listed species. The federal guidelines suggest that the metric used to assess credits and debits should measure both wetland acreage and function. The credit system should always be expressed and measured in the same way as the impacts of the development projects. Acreage serves as the most commonly used metric used for most wetland mitigation banks even though federal guidance recommends using measures of wetland function instead. Techniques to assess wetland function and to compare habitat suitability include the hydro-geomorphic approach, the Wetland Evaluation Technique, the Wetlands Rapid Assessment Procedure, and Habitat Evaluation Procedures Regulations for wetland mitigation banks generally suggest a 1:1 loss to gain ratio to support the goal of "no overall net loss" of wetland value or function. The goal of the *conservation banking* is to offset the impacts to listed species; therefore, mitigation efforts can be on-site or off-site, depending on whether the affected species or critical habitat is endemic. Federal guidelines require impacts to a particular species or habitat to be compensated for by offsetting losses to the same species or habitat type (e.g., a "species for species" trade-off). (Source: EFTEC 2010:97-98).

(ii) **Opportunity costs**

Without high value under pressure of development and low value land available for rehabilitation and conservation there is no cost-saving to be made by developers nor rent to be made by private brokers of trading and banking, and no additional income to landowners at conservation sites.

Cost and quality differentials. Transfer ratios and conversion factors reflecting differences in land area and habitat quality can make off-set prices/ha inadequate to compensate landowners carrying out rehabilitation, and too expensive for developers wishing to buy credits.

Correlation of habitat equivalence, opportunity costs and extent of individual markets. Allowing trade between different habitat types decreases costs of off-sets, but also reduces effectiveness / the likelihood of finding equivalent habitat. The stricter the like-for-like habitat is practiced, the smaller the area within which trade can take place, because habitat types are expected to be spatially auto-correlated at local scales. Property values and opportunity costs in rural areas are similarly spatially auto-correlated, due to similar biophysical characteristics determining both agricultural productivity and habitat types.

Opportunity cost differential, transaction costs and market size. Off-set credit suppliers face set-up costs, and authorities face monitoring and enforcement costs. These costs need to be covered by a sufficiently large differential in opportunity costs between trading locations for a habitat banking market to be financially viable. Fixed set-up costs also need to be spread across as many trades as possible. A regional sized market with many potential buyers and sellers, spread across locations with large opportunity cost differentials is ideal from a market point of view. In areas where habitat types and environmental conditions are spatially auto-correlated, the need for a large market will be in tension with habitat like-for-like equivalence requirements. For this reason, Brazils TDR system first requires trades to be sought within local catchment of 3rd or 4th tributaries (EFTEC et al., 2010, appendix).

Additionality and opportunity costs. Additionality requirements and opportunities for cost-savings on trading are in conflict. Sites with low opportunity costs are more unlikely to be developed anyway, so there is an incentive for landowners to offer these areas first for a biodiversity off-sets program. When these would have regenerated naturally through lack of use, there is a question of whether the off-sets generated offer benefits that are additional to those that would have come about without the trading scheme. The higher the opportunity costs at the rehabilitation site, the more likely it is that off-sets will be additional, but the lower is the differential in opportunity costs between sites. A low cost saving potential makes the rents that can be made from a trade lower and the market smaller.

(iii) Motivational aspects

Private actors, whether landowners or brokers, seek to minimize costs of complying with development caps and conservation targets. Private motivations to provide public goods beyond regulated caps are exceptional.

Motivations to substitute between compensation possibilities. Like-for-like habitat offsets are costly. If there is to be sufficient demand generated by an environmental liability of a cap on development or a no net loss policy target, developers must have few alternative ways of gaining additional development potential other than biodiversity off-sets.

Biodiversity off-set residuals versus conservation target achievement. Full rehabilitation of a habitat is expected to be more time consuming and costly the more biodiverse and ecologically complex a habitat is. There is therefore a private motivation to rehabilitate quickly and simply. There is evidence that rehabilitation projects have fallen short of re-establishing reference/base-line levels of biodiversity and ecosystem service provision (Benayas *et al.*, 2009). This leads to biodiversity off-set residuals also at the offset site (location B, in the figure III.2 above).

'Licence to trash' versus 'trading up'. Legal compensation possibilities may open up for local government approval of destructive development options, motivated by local interests to capture rents from development. On the other hand, companies and municipalities wishing to increase public goodwill as part of e.g. corporate social responsibility agenda, may be motivated to buy extra or higher quality or offsets in what is known as 'trading-up'.

(iv) Transaction costs

The smaller the opportunity cost differentials between development and off-set sites, the more limited the available habitat sites, the more options there are to avoid complying with equivalence, and the higher the uncertainty about results, the more need there is for a public-interest regulator. Transaction costs of implementing a habitat banking scheme will increase correspondingly.

Equivalency and transaction costs. Achieving equivalency between the type of damage and the off-sets is costly. Monitoring and evaluation of on-site mitigation measures and off-site off-setting measures implies costs additional to monitoring of compliance of land use regulation (without trading).

Time equivalency, transaction costs and extent of market. In habitat banking a rapid loss due to development is traded for a slower gain in the rehabilitated habitat. In the period from development to full rehabilitation in an offset site, damage may go uncompensated, requiring additional off-set area to compensate for interim damages. Long rehabilitation times create uncertainty regarding effectiveness, requiring either an additional area of off-sets to compensate for the risk of not achieving full rehabilitation in the long term, or limiting the habitat banking market to only habitats that have rapid restoration times (e.g. wetland creation which measured in terms of area is rapid, versus forest regeneration which is slow). Rapid restoration habitats are by definition less of a biodiversity conservation issue, than slow generation habitats. The habitat banking market would therefore be limited to sites of less conservation interest for biodiversity, even though they may still be of interest to a particular species or ecosystem service (e.g. fish and recreation in the case of wetlands).

Information costs vs. opportunity costs. Where trading takes place in a similar environment, say within a catchment, the information costs are expected to be lower for locating land with similar habitat to that lost to development. However, opportunity cost differentials between locations can

also be expected to be low. In larger markets offering higher opportunity cost differentials, the information costs of identifying sellers and buyers of off-sets may also be higher, requiring some type of information broker such as a habitat bank. The increased information costs of the broker are recovered from the opportunity cost savings on each trade through a surcharge.

Private internalization of environmental costs, through externalization of transaction costs to the public. The larger the off-set market the more likely it is that a habitat bank can recover its brokering costs, that landowner's opportunity costs of generating off-sets can be compensated, and that developers can reduce their costs of impact mitigation. However, we argued above that this has the potential to lead to greater information costs in finding off-set habitats that are equivalent. Monitoring and enforcement costs are required at both rehabilitating and developing locations – is there reason to expect that these costs would be lower than under land use zoning schemes without off-set trading? Monitoring and enforcement also need to be carried out by a third party, which makes it likely that a public regulator must carry some of the costs.

Land-use zoning, alternative, baseline or precondition? Habitat banking is sometimes compared to "a command-and control system of zoning alone" (Santos et al., 2011a:75). Habitat banking has the potential to let developers internalize the impacts of their development on habitats at a lower cost, relative to a pre-existing land use zoning scheme without trading. However, it is not clear that habitat banking reduces total transaction costs for society, given that land-use zoning and development caps are a precondition for establishing an off-set market in the first place, rather than an alternative to it.

2.4.2 Equity

Equity concerns the distributional effects of the chosen system – who suffers from losses and who benefits from gains of habitat banking? Reviews of habitat banking have placed less emphasis on this aspect than effectiveness and cost issues. Santos et al. (2011a) address several points, including the prerequisite stakeholder involvement, increasing social justice of zoning regulations, the size of the market area, new source of income for local communities, receiving area equity and tenure equity for landowners.

Most authors agree that involvement of stakeholders at both the regenerating and receiving site for off-sets is a prerequisite for the legitimacy of changing land-use practices. There is also a broad perception that TDR schemes increase the social justice of zoning regulations because development restrictions may be compensated in zones generating off-sets, while developers have to pay for additional development exceeding the prior legal limit development cap (Santos et al., 2011a). However, this assumes that the prior existing zoning scheme and the development restrictions were both ineffective and unjust.

Development of site ecosystem services and size of market. As seen above, cost-minimization of a habitat banking scheme is expected to be greater in a larger market, while the effectiveness of larger areas is in doubt because of increasing problems of finding like-for-like habitats. Credit sites far away from the damage may also not compensate stakeholders around the development site for adverse effects (EFTEC et al., 2010). This critique recognizes that the habitat lost to development may have been generating ecosystem services to the local population, which are not accounted for in the financial compensation to the landowner herself. Some TDR schemes in

Brazil try to minimize this possible 'externality' on neighbors by prioritizing trades within the same catchment.

New sources of income for local communities. Transaction of development or habitat credits is generally regarded as a new source of income for local communities generating the credits and those involved in the habitat banking system. A closer look at expected employment generation from habitat banking schemes reveals that employment opportunities are composed almost entirely of trained professionals who would not be expected to live in rural communities generating the off-sets (Table III.3). If anything, this preliminary analysis of employment opportunities shows that development areas and urban communities offering financial and technical services would be the ones to benefit from habitat banking schemes. The employment opportunities listed in Table III.3 also provide an indication of the transaction costs involved in running a habitat banking scheme.

Tenure equity for landowners. Compensation of landowners for opportunity costs of providing additional habitat for off-sets has been criticized for applying flat rates that do not provide a premium for ecologically critical parcels, agglomeration of rehabilitated sites, or land under high development pressure. There are some problems with these arguments. While land under high development pressure would be expected to fetch high market prices this may not be captured if residents don't have full land rights. On the other hand, ecologically critical parcels would not be expected to be open for trading if they could be identified as critical *ex ante*. Agglomeration bonuses could be recognized by differentiating off-set types. Other authors question the fact that habitat banking – as with PES in general – seeks 'lowest cost of conservation' opportunities, compensating landowners at their current level of poverty (Karsenty, 2007). Especially in developing countries conservation easements would lock local communities out from any development opportunities and future gains in the value of their land. This is obviously a 'hard' trade-off of conservation versus development faced by all compensation-based conservation instruments.

Table III.3 Distribution of employment opportunities with habitat banking Source: Bovarnick et al., (2010)

Employment type	Specific employment opportunities
Design, establishment and maintenance of habitat banks	Wetland conservation scientists, biodiversity conservation scientists, hydrological engineers, conservation wardens, landscape engineers, forestry professionals, habitat restoration experts, construction workers
Monitoring, evaluation and verification	Wetland conservation scientists, biodiversity conservation scientists, forestry professionals, habitat restoration experts
Legal support	Property lawyers, financial lawyers
Registry and administration	Market administrators, registry specialists, public administrators
Project finance & banking services	Investment bankers, venture capitalists, commercial bankers
Market information services	Market researchers, news and intelligence analysts
Fund creation and management	Investment fund managers, fund management consultants
Project technical support	Environmental consultants with knowledge of habitat and wetland restoration, NGO specialists, researchers

Receiving area resident outcome equity. Agglomeration of development in areas buying biodiversity offsets or TDRs can also lead to environmental impacts that are not accounted for in the calculations of habitat compensation requirements. For example, development may lead to congestion and pollution issues at the development site. Lower accessibility of natural environments for local communities may be another effect of 'running down' a cap on local development. However, these are not meant to be dealt with by biodiversity off-sets, but through the strategic environmental assessment and implementation of the mitigation hierarchy on-site by the developer.

Uncertainty, risk and equity. Predicting mitigation needs on and off-site is more complicated than Figures III.1-2 suggest due to variability in natural processes, in development pressures on land use, and time-lags in rehabilitation of habitats. Uncertainty makes predicting 'net habitat' at sites A&B more difficult, and differences between ecosystem services lost/gained between sites more unpredictable (Figure III.4). Time lags in rehabilitation – especially for more complex habitats – increase this uncertainty, risk of incomplete rehabilitation and failure to offset. Increasing off-set ratios or development of secondary insurance and bond markets may 'offset the risk of offsets', but this in turn raises the transaction costs and questions about equity (these legitimacy issues are discussed further in Appendix).

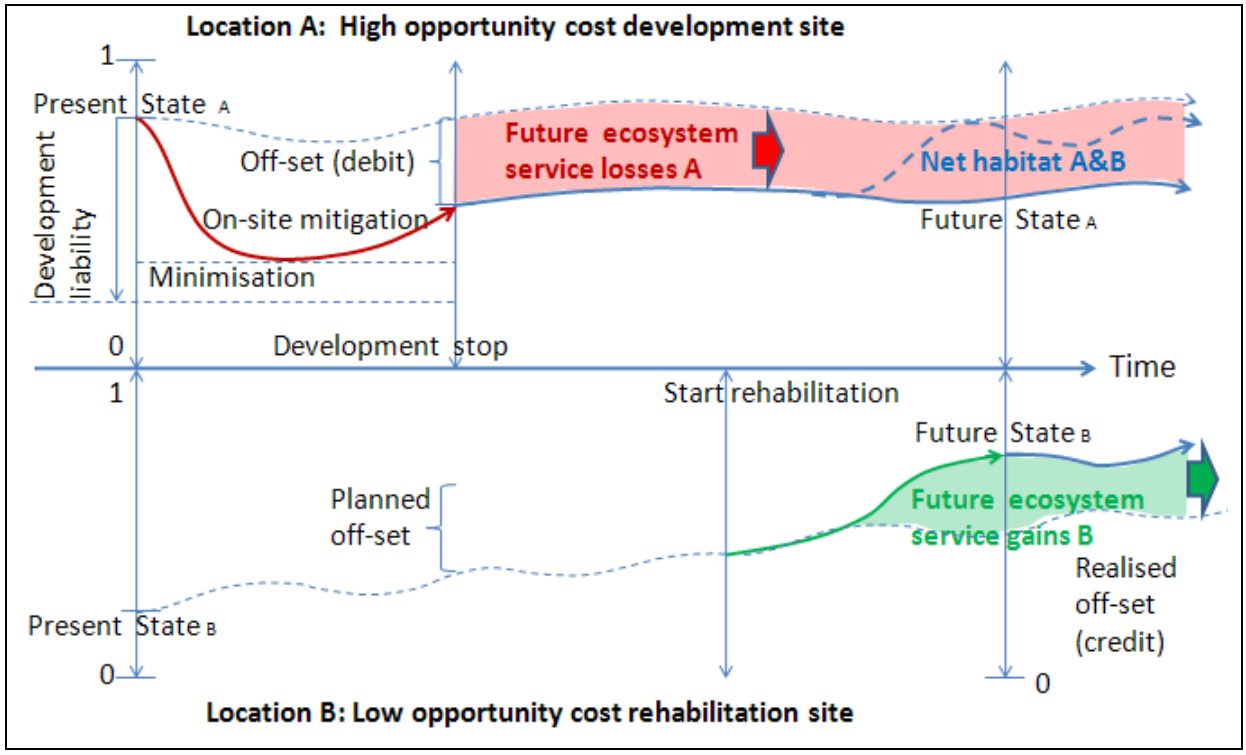

Figure III.4. Equivalence of ecosystem services gains and losses with ecosystem dynamics

3. ECOLOGICAL FISCAL TRANSFERS[34]

3.1 DEFINING ECOLOGICAL FISCAL TRANSFERS IN BIODIVERSITY CONSERVATION

Protected area regulations as typical regulatory instruments on their own are not enough. Instead, a combination of regulation and economic instruments capable of offsetting the costs associated with protected areas is required. Whereas PES schemes reviewed in Part II address payments to private actors (often with public funding), ecological fiscal transfers are transfers of public funds from central to local government level to compensate for opportunity costs to local government of establishing and managing conservation areas or other environmental measures. They may also be motivated by positive spill-over benefits to nearby areas or the country at large.

Intergovernmental fiscal transfers help lower level governments cover expenditures in providing public goods and services. Fiscal transfers from central to local level very often have a 'fiscal equalization' purpose to adjust for local government fiscal capacity and needs so that public service levels per capita at the local level are more equal. Fiscal transfers may also be earmarked to the implementation of certain central policies, and conditional on local government performance. However, the bulk of fiscal transfers is allocated in the form of lump-sum or general purpose (unconditional) transfers.
Decisions about where conservation areas are to be sited are frequently taken at higher levels of government, even though the costs of losing those areas for other social and income-generating developments are borne by local governments and communities. Ecological fiscal transfers are therefore seen as an instrument to provide incentives for local governments to support and maintain the quality of water and nature conservation areas within their territories, but which can also provide wider ecological benefits beyond municipal boundaries (Ring, 2008; TEEB, 2009).

Ecological fiscal transfers for biodiversity conservation build on existing protected area regulation in that they use officially designated protected areas – their area and sometimes also conservation-based indicators of quality – as an indicator to allocate fiscal transfers. Ecological fiscal transfers have the potential to turn the oft-encountered local opposition towards protected areas into active support, but for this to occur requires that municipalities and/or state governments inform the citizenry and local officials of the relation between protected areas and the additional revenues, and make an effort to reward them for enhancement in biodiversity protection in an adaptive governance strategy.

The funding involved in fiscal transfers may have as its source tax revenue or redistribution of international transfers of funds such as REDD+. By addressing local government land-use decisions, ecological fiscal transfers complement a policymix of economic and regulatory instruments largely addressing private actors.

[34] The text of this chapter is a summary of a review of ecological fiscal transfers conducted by Irene Ring and colleagues for the EU FP7 funded POLICYMIX project (Ring *et al.*, 2011).

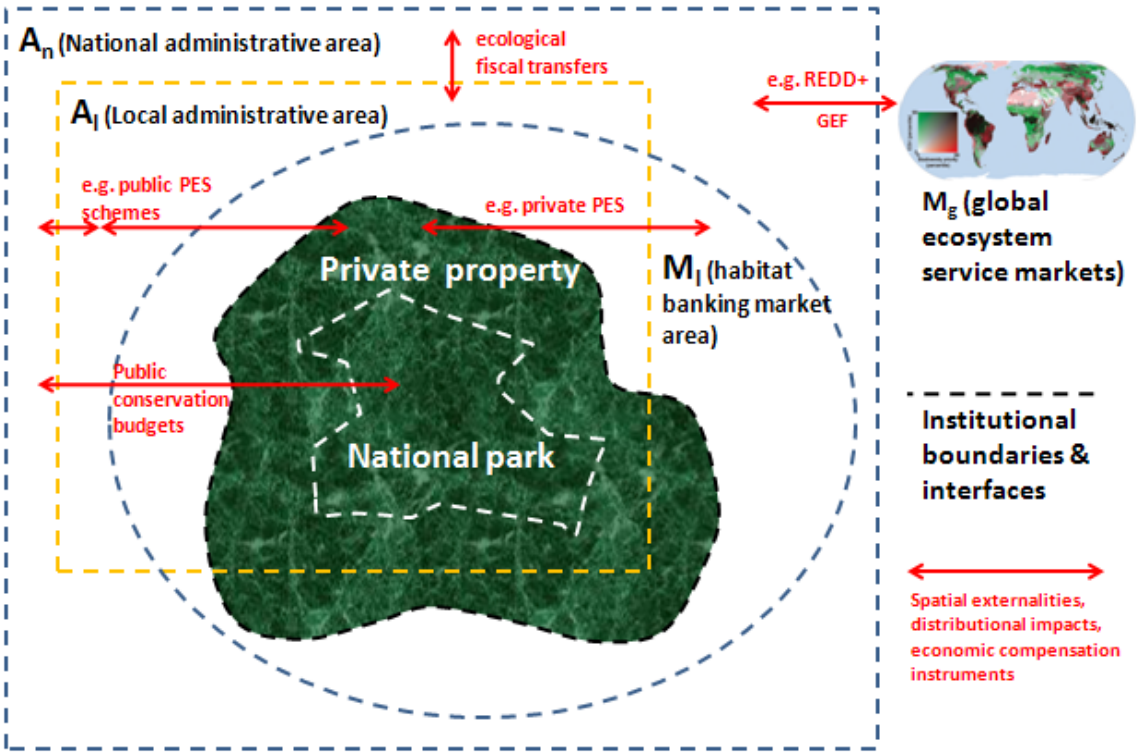

Figure III.5 Ecological fiscal transfers complementing other economic instruments in a policy mix

Ecological fiscal transfers are transfers of public funds from a central government to a local government level to compensate for opportunity costs to local government of conservation areas or other environmental measures. They may also be motivated by positive spill-over benefits to other governments that may range in the case of biodiversity conservation from local to national and even global benefits. Public funding may have as its source tax revenue or redistribution of international transfers of funds such as REDD+. By addressing local government land-use decisions, ecological fiscal transfers complement a policy mix of other economic and regulatory instruments largely addressing private actors.

How widespread are ecological fiscal transfers? So far, fiscal transfers with biodiversity conservation-related objectives have only been implemented in a couple of countries and are at present a rather minor part of intergovernmental fiscal transfer schemes. Only Brazil and, more recently, Portugal have implemented fiscal transfers for biodiversity conservation. Starting with Paraná state in 1991, Brazil became the first country to introduce their ICMS Ecológico – financed through a percentage reallocation of value-added taxes collected at the state level. It now exists in a total of 13 Brazilian states to compensate municipalities for land- use restrictions imposed by protected areas (Figure III.6).

Figure III.6 implementation of ICMS-Ecológico in Brazil (2008)

ICMS-Ecológico (ICMS-E) is an ecological fiscal transfer using ecological indicators to redistribute state-level value-added tax on goods and services back to local level. By 2008, 12 Brazilian states had implemented ICMS-E (map). By 2011, 15 states have legislation and 13 states have implemented the scheme (Ring et al., 2011). (Map Source: Ring et al., 2010)

Starting with experiences from Brazil, ecological fiscal transfers have been increasingly studied during the past decade (Grieg-Gran, 2000; Loureiro, 2002; May *et al.*, 2002; Ring, 2008). In a number of other countries, ecological fiscal transfers for biodiversity conservation have so far only been proposed, and potential consequences partly modeled including Germany, Indonesia and India (Ring et al., 2011).

Within the European Union, Portugal is the pioneer in introducing ecological fiscal transfers. Portugal is the first EU Member State to recognize protected areas as an indicator for the redistribution of public revenues through fiscal transfers from the national to local governmental level (Santos *et al.*, 2010). Portugal's legislation on ecological fiscal transfers was introduced in 2007 and is so recent that it is too early to observe any change in protected area coverage and local public agents' decisions and attitudes towards conservation.

In Norwegian conservation policy, the new Nature Diversity Law of 2009 mandates state compensation for costs of establishing land-use regulations for biodiversity conservation (NOU, 2009)[35]. In the near future, ecological fiscal transfers may also play a role in the implementation of international programs on a nationwide scale, linking climate mitigation with biodiversity conservation policies (Ring *et al.*, 2010). For example, REDD+ initiatives (Angelsen 2008) actively supported by the Norwegian Government, will need to take into account fiscal transfer schemes to the local level as one important means of channeling international payments for biodiversity conservation and climate mitigation from the national down to lower levels of government (Ring et al., 2010).

[35] In this regard, Friends of the Earth Norway have proposed that the fiscal transfer formula (the "kommunenøkkel" – or municipal key) be updated "so that those municipalities that are best at preserving nature and thereby biodiversity and ecosystem services are rewarded" http://naturvernforbundet.no/nyheter/loennsomhet-i-naturbevaring-article17382-166.html and Kommunal Rapport 10.9.10.

3.2 POLICY AND DESIGN ISSUES

Existing ecological fiscal transfers in Brazilian states and Portugal use officially designated protected areas and/or areas designated as water catchments for drinking water provision as indicators to allocate lump-sum transfers to local governments.

In most schemes, just the protected area coverage as a quantitative indicator is used. In Portugal, transfers per hectare protected area are higher, if protected area coverage in relation to municipal area is beyond 70 % (Santos et al., 2010). In Brazil, the different categories of protected areas are further multiplied by a conservation factor or weight, reflecting the varying land-use restrictions associated with, for example, strictly protected or sustainable use areas (Grieg-Gran, 2000; May *et al.*, 2002; João, 2004; Ring, 2008). For example, parks, reserves and ecological stations are afforded the highest weight (0.7-1.0), environmental protection areas (APAs) which offer many options for direct use are given the lowest weight (0.1), whereas private nature reserves (RPPNs) range in between (0.2-1.0) (Ring et al., 2011). States such as Paraná and Minas Gerais, have introduced a quality indicator of protection into relevant legislation. The qualitative aspect of the Paraná allocation scheme is unique, referring to aspects which are judged to improve the relative degree of conservation integrity of those areas protected within a given municipality.

3.3 OUTCOME LEGITIMACY

3.3.1 Effectiveness

Environmental effectiveness of ecological fiscal transfers has not been explicitly addressed in the literature. Being a compensatory measure, there is no additional environmental objective to be achieved with the policy instrument. The baseline for ecological fiscal transfers for biodiversity conservation may be interpreted as the amount of designated protected area when the instrument is introduced, though the lump-sum payment related to ecological fiscal transfers is adjusted each year in recognition of additional protected areas that come into being.

In principle, recognizing the positive spatial externalities associated with protected areas provides a positive incentive for municipalities to acknowledge and value the natural capital within municipal boundaries, when this is otherwise mostly perceived as an obstacle to development. No recognition of positive externalities – whether they are provided by private or municipal actors – is expected to lead to an under-provision of the relevant public goods and services, in this case nature conservation (Ring, 2008a).

Although the ICMS Ecológico (ICMS-E) has originally been introduced as a compensation for land-use restrictions, it developed at the same time as an incentive to create new protected areas (May et al., 2002). The increase in protected areas in a number of Brazilian states after the introduction of ecological fiscal transfers has been attributed to ICMS-E (Bernardes, 1999, Loureiro, 2002, May et al., 2002, Ring 2008a). Recent numbers for Paraná indicate that in total, protected areas have increased by 164.5 % since the introduction of the ICMS-E (Ring et al., 2011). This increase has mostly taken place within the first 10 years after the instrument had been introduced, indicating a possible saturation effect as low opportunity cost and available land for protected areas becomes scarce. In order to establish attribution of ICMS-E to protected area

creation it is also important to check whether the baseline area of protected areas was static or in an upward trend at the time of the instrument's introduction in the relevant state. For ICMS-E to have an incentive effect indicators in these schemes need to be sufficiently easy to grasp and monitor, and statistically available (Ring, 2008a).

In Portugal, the analysis presented by Santos et al. (2010) shows that ecological fiscal transfers can be significant for some municipalities in which the amount of land granted conservation status constitutes a large part of their overall territory. The ecological criterion may thus work as an incentive for municipalities to maintain or increase their protected areas; in terms of quantity, however, this must be complemented with quality criteria to also provide incentives for the management of those areas. As the Portuguese scheme has only been introduced in 2007, it is too early to identify an incentive effect in practice. The new Law by simultaneously introducing a significant number of changes in the Portuguese intergovernmental fiscal transfer scheme, makes the ecological component difficult to grasp by the stakeholders affected (namely municipal authorities) due to the presence of many crossover effects (Santos *et al.*, 2011b). Therefore, informative instruments and activities are an important factor to motivate municipalities for more and better biodiversity conservation.

3.3.2 Efficiency

Introduction costs for ecological fiscal transfers are reasonably low. This holds especially true if easily available indicators are used, such as the protected area coverage (Ring, 2008a). Costs of conservation measures themselves do not apply to ecological fiscal transfers if the aim of the instrument is only to compensate for opportunity costs. The implementation costs of ecological fiscal transfers are comparatively low because they do not require new institutions or a new bureaucracy (Ring, 2008a). By introducing an easily available ecological indicator into the existing fiscal transfer mechanism such as protected area size, ecological fiscal transfers build on existing institutions and administrative procedures. This may not be true, however, for the implementation of qualitative indicators, which requires a regular field validation of protected area management quality and relevance to local sustainable development. If a quality criterion is implemented, like in the case of Paraná, the quality of protected areas needs to be monitored at regular intervals by conservation authorities. However, the effectiveness of ecological fiscal transfers for biodiversity conservation is far greater with the implementation of these parameters and some kind of conservation monitoring related to performance of protected areas is often required anyway (e.g., Natura 2000 network in Europe). Therefore, quality monitoring for ecological fiscal transfers should build on regular conservation monitoring activities executed by conservation authorities to increase efficiency.

3.3.3 Equity

The social impacts of ecological fiscal transfers are related to redistribution effects of resources between municipalities, any additional impacts caused by municipal spending, and the effects of formal protected areas on local land users.

In Latin American countries, most public revenues still stem from value-added taxes that hit the poor harder than the rich. To the extent that ecological fiscal transfers build on public revenue

from value-added taxes the effects will be regressive. Currently, the schemes in operation in Brazil only redistribute a portion of the existing VAT. More generally, distributive aspects need primarily to be dealt with as part of the general tax system of a country.

In the case of the ICMS Ecológico in Brazil, a certain percentage of state ICMS revenues – the most important tax in terms of public revenues at the state level – is reserved for distribution among local governments with conservation units. This clearly leads to winning and losing municipalities because other indicators have been lowered with the introduction of the ICMS Ecológico. Nevertheless, the success of ecological fiscal transfers is linked to a strong tax, the revenues of which usually show an increasing trend over the years, especially in times of economic growth.

In other countries, ecological indicators may also be introduced as part of the fiscal need determination of a jurisdiction, which is then entered in a formula-based procedure and weighted against the fiscal capacity of the relevant jurisdiction. If own source revenues are low and protected area coverage high, then the new ecological indicator increases fiscal need and thus the transfers received by the municipality. In this way, poorer municipalities in rural areas with low revenues (e.g. due to low population densities and/or little economic activities) and high protected area coverage benefit most (Ring, 2008b).

At present none of the ecological fiscal transfer schemes in operation in Brazilian states or in Portugal allow earmarking of the transfer on conservation-related spending in municipalities. They have been introduced using funds where constitutional regulations foresee lump-sum transfers to guarantee municipal financial autonomy. This also means that the new transfers could be used for environmentally harmful activities, even to the point of promoting activities that potentially destroy or degrade valuable habitats. Therefore, it is important to consider both quantity- and quality-related indicators in ecological fiscal transfers.

To the extent that ecological fiscal transfers work as an incentive for park creation at the local level, the instrument also has some social impacts on landowners within the parks. 'Effective management' of parks and reserves that are meant for exclusion of humans may mean clamping down on social benefits derived from low impact uses of such lands by communities neighboring on or residing within these areas. Direct compensation of landowners for e.g. expropriation or use restrictions of national park creation is not addressed with ecological fiscal transfers. Because municipalities have financial autonomy, and the transfers are mainly directed at compensating for financial costs (e.g. loss of tax revenues) from avoided development, ecological fiscal transfers are not generally used to compensate landowners. However, there is evidence in Brazil that municipalities have used funds to encourage private conservation efforts (Ring, 2008).

4. REFORMING SUBSIDIES

This section gives a brief assessment of subsidy reform as a potentially important component of any mix of instruments to increase potential financing for conservation and create more appropriate incentives. Subsidy reform is not a new mechanism as such, but has been placed in Part III of this report because reform processes are in their infancy in most parts of the world and substantial progress is necessary. The TEEB study, for example, calls for 'doubled efforts' to reform subsidies (ten Brink et al., 2009).

4.1 WHAT ARE SUBSIDIES?

Subsidies come in many shapes and forms. A common definition of a subsidy is "….government action that confers an advantage on consumers or producers in order to supplement their income or lower their cost" (OECD, 2005). Subsidies are most commonly thought of as direct transfers (or potential transfers, e.g., covering liabilities) from the government to private or civil-society actors. But they may also consist of income or price support, tax credits, exemptions and rebates, loans on special terms, and preferential treatment of various kinds (ten Brink et al, 2009).

Some of the subsidies can be read out of public budgets (e.g. national accounts) and some are not-accounted for ('off-budget'). Due to the wide heterogeneity of subsidy types and varying degree of formal accounting, statistics on subsidies are fairly sketchy. However, work is ongoing to systematically record and calculate direct and indirect subsidies, for example in the World Trade Organization.

According to the definition above, and as discussed in Part II of this report, PES schemes financed by governments are subsidies. Subsidies are introduced and maintained for various social, environmental and economic reasons. Many of these are good or politically rational reasons (ten Brink 2009). For example, as emphasized in environmental economics, a subsidy can be sensible and efficient if given to reduce so-called environmental externalities or encourage positive ones. PES schemes try to stimulate the generation of positive externalities (or avoidance of further negative ones), given that landowners often in practice are seen to have the right to keeping the existing situation (or to cause further environmental degradation – as discussed in Part I). While renaming 'subsidies' to 'payments' may seem to have increased their legitimacy, caution is necessary. As pointed out by ten Brink et al (2009) even so-called green subsidies may distort economies and markets, and may not be well-targeted or cost-effective – as we have also seen with several ongoing and previous PES schemes.

Many subsidies all too often end up distorting prices and resource allocation decisions, typically also harming the environment. Typical examples of such subsidies are the ones stimulating over-production (e.g. within agriculture) or over-consumption (e.g. the use of coal in energy production, petrol for cars). Whether subsidies are good or bad often comes down to their objective and their specific design and implementation. Pieters (2003) include the following questions:

- Do they serve (or continue to serve) their intended purpose?
- At what cost (efficiency)?
- How are the costs and benefits distributed (equity)?

- Are they harmful to the environment in general and for ecosystem services and biodiversity in particular?

4.2 REFORMING SUBSIDIES – A POTENTIAL WIN-WIN?

The overall level of subsidies is enormous. Subsidies to agriculture, the largest of all subsidies, are estimated at 250 billion US$ per year in OECD countries alone (ten Brink, 2009). Subsidy reform has been on many government agendas since the early 1990s and has been pushed after 2000 by, for example, a series of studies by the OECD (OECD, 2003, 2005).

The main rationale for subsidy reform is to restore resource allocation efficiency, i.e. direct scarce resources to areas of production and consumption where they are valued the highest. Further, subsidies are typically financed by taxes that create their own efficiency losses in collection. Finally, as inefficient subsidies are cut, scarce government resources can be freed for more productive uses, including funding of conservation policies. Although some subsidies may be particularly bad for biodiversity and ecosystem services, e.g., biofuel subsidies and agricultural subsidies that stimulate over-production in general (OECD, 2008), it is important not to restrict subsidy reform only to those subsidies that are explicitly bad for the environment.

Achieving these efficiency gains through subsidy reform (or removal) has proven tremendously challenging. Although the *effectiveness* and *efficiency* arguments for removing or reducing many types of subsidies are compelling, issues of *equity and process legitimacy*, and share complexity of reform, are effectively halting progress in this area.

As concluded by Pearce and von Finckenstein (2000):

"The complexity arises from the fact that subsidies are manifestations of rent-seeking, which, in turn, is part of a wider category of unproductive activity in economic systems. Rent-seeking involves redirecting economic resources to special interest groups rather than using resources productively. Interest groups then use those resources to reinforce their privileged positions. Subsidy reform will inevitably conflict with those special interests. The idea that subsidy reform is a "win-win" policy is therefore misleading – there will always be losers, even if they are undeserving losers. In many cases, the most harmful subsidies will be those that are least easy to remove".

This quote may be a bit strong, as some subsidies may have legitimate and sensible objectives. However, a large share of subsidies seems still to fall in the category criticized by Pearce and von Finkenstein.

Hence, removing or reducing ineffective subsidies that have no current legitimate objective is often a painful process for the interest groups that stand to lose and they will fiercely oppose such changes. Such potential conflicts can be sought alleviated through broad stakeholder engagement, transitional assistance (to ease the pain), increased transparency and information exchange (which may increase the broader support for reform). Ten Brink et al. (2009) have drawn up a road map for reform of subsidies (see Box III.4 below), acknowledging the equity issues involved in subsidy reform.

Text Box III.4 Developing a road map for reform: a checklist for policy-makers

14. Assess the costs and benefits of potential reform in more detail:

- potential **environmental benefits**: include thinking on benefits in other countries and secondary effects, which can be perverse;
- potential **economic costs**: e.g. national (tax, GDP, etc), sector-wide, for winners and losers within the sector (including new entrants/future industry), for consumers/citizens (affordability);
- potential **social impacts**: e.g. jobs, skills, availability of goods/services, health;
- potential **competitiveness and innovation benefits**
- potential **ethical benefits** e.g. as regard fairness of income, appropriateness of support, links to future generations;
- is the reform **practical and enforceable**?

To identify the likelihood of success and whether it is worthwhile using political capital for reform, the following questions can be useful to set priorities for the road map.

Is there a policy/political opportunity for action?

15. Is there a window of opportunity? e.g. policy review process, evaluation, public demand?
16. Is there a potential policy champion?
17. Will there be sufficient political capital for success?

These questions can be answered at different levels. A quick scan can help develop the overall picture, but more detailed analysis is needed to clarify the details, identify what should be the exact nature of the reform and support the call for subsidy reform.

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Source: ten Brink et al., (2009)

4.3 CONCLUSIONS AND TRANSFERABILITY TO DEVELOPING COUNTRY CONTEXTS

As we have seen, some subsidies may serve sensible and legitimate purposes such as many PES schemes. However, a larger share of subsidies creates distortions, demand scarce public resources and may be harmful to the environment. In a developing country context, such subsidies are often closely linked to social policies aimed to alleviate poverty. However, they are also often linked to corruption, making change difficult. Reform of subsidies should in developing countries go together with broader macroeconomic and political reforms. However, as pointed out by Pearce and Finckenstein (2000), democratic political reforms are not sufficient as western democracies have higher subsidies than the rest of the world.

Interestingly, in these days of government fiscal crises, Pearce and Finckenstein (2000) argue that moments of crisis may be transformational, i.e. give governments a 'sudden shock' pushing reform:

> *"Some have advocated "sudden shocks" whereby dramatic events are seized as an opportunity to institute reform. There is some evidence to suggest that if a crisis does occur, it may be best to implement subsidy reform along with other transitional measures in one large package An alternative is to let the almost inevitable growth of subsidies produce economic bankruptcy, and then institute reform. But many societies have proved surprisingly resilient whilst sustaining extensive subsidy regimes, and the costs of waiting may not be acceptable anyway."*

It remains to be seen whether the current "fiscal" window of opportunity is seized, potentially freeing financing for other policies, including biodiversity and ecosystem policies.

APPENDIX. HABITAT BANKING – EFFECTIVENESS, EQUITY ANDFAIRNESS IN THE PRESENCE OF HABITAT DYNAMICS

by

David N. Barton

The independence in the timing of assessment of damage (debits) and assessment of offsets (credits) is the key feature distinguishing habitat banking from biodiversity offsets (EFTEC 2010). EFTEC (2010) has a comprehensive discussion of issues that remain to be resolved for habitat banking to become a reality. The report addresses as 'Secondary issues' the topics of managing risk, accounting for time preference, achieving conservation targets and social equity. In this appendix we devote some more attention to these 'secondary issues', believing that uncertainty of habitat and land-use dynamics may make them key to stakeholders' interpretation of the fairness of habitat banking.

Either development takes place at location A before the rehabilitation project at location B, creating an offset debit (Figure A1), or rehabilitation takes place before the development in which case an offset credit is generated (Figure A2), EFTEC(2010).

Particular problems for the legitimacy of habitat banking in separating offsetting activities from development temporally and spatially in the presence of dynamics and uncertainty are explained below with the help of a series of diagrams:

1) compensation of interim habitat losses (Figure A3)
2) compensation of ecosystem service between sites (Figure A3)
3) uncertainty in predicting biodiversity offset and achieving a "no net loss" conservation target in a dynamic ecosystem (Figure A4)
4) uncertainty regarding the distribution of ecosystem service gains and losses between the development site and the offset site (Figure A4)
5) restoration time lags for the most biodiverse and complex ecosystem types, and problems of discounting present and ecosystem service losses against future gains. (Table A1)

1. Compensation of interim habitat losses (Figure A3)

Off-sets are ideally generated ex ante a development and stored as credits until purchased. Given long lead times in identifying restoration sites and time lags in restoration that are longer the more complex the ecosystem (Table A1), there is a risk that off-sets are generated ex post of a development. Assuming here that an equivalent habitat can be found, there are still interim losses in habitat and ecosystem services which would require offsetting. A higher than 1:1 ratio offset would be required to compensate for interim loss.

2. **Compensation of ecosystem service between sites (Figure A3)**

In Figure A3 we assumed that (i) opportunity costs are fully compensated, (ii) that there are no dynamics in the habitat so that the future states of ecosystems at locations B and A are known, (iii) that there is no net loss of habitat by the time rehabilitation is completed. Even under these ideal conditions ecosystem service losses at site A may not have been compensated by ecosystem service gains at site B, because the constellations of users, their locations relative to the development and off-set sites, and their use intensity at locations A and B are likely to be different. While opportunity costs of landowners at site B are compensated, and habitats equivalently restored (their composition, structure and function on-site), loss of ecosystem services at and around site A is not necessarily compensated by gains at and around site B. Examples of such externalities include loss of landscape cultural values (aesthetics, recreational opportunities) for populations around the development site that are not compensated by off-sets at a different site and time unless they are equivalent in terms of access.

3. **Uncertainty in predicting biodiversity offset and achieving a "no net loss" conservation target in a dynamic ecosystem (Figure A4)**

In Figure A4 we introduce some dynamics in terms of habitat quality fluctuating at location A due to a natural variability – this might be the example of habitat extent and structure changing between years due to e.g. droughts. At location B we assume both natural variability and a downward trend in habitat extent/quality due to human pressure. This may be the case where increasing population is expected in an initially rural area that is being used for habitat rehabilitation for habitat banking purposes. Uncertainty in the baseline future states of habitat at both locations make planning for the offsets demanded more difficult. The challenge is illustrated in the need to predict the line in Figure A4 "net habitat A&B". In order to guarantee that equivalent habitat is rehabilitated larger offset ratios than 1:1 are required, the ratio being larger, the greater the variability between the sites. Differences in land-use development trends between sites would increase the ratio further. Increasing offset ratios comes at the cost of rehabilitating additional areas relative to a situation with no uncertainty (as in Figure 3A). This is an illustration of the cost of uncertainty to a habitat banking scheme. Perception of this uncertainty by stakeholders at both sites may magnify calls for increasing the off-set ratios between sites, and if not addressed jeopardize perceived fairness of the habitat banking schemes.

4. **Uncertainty regarding the distribution of ecosystem service gains and losses between the development site and the offset site (Figure A4)**

Differences in natural variability and changing land-use pressures between the sites could also affect the expectations stakeholders have of losses of ecosystem services at site A and gains at site B. This challenge is illustrated by the need to predict – at the time the development is completed and the off-set is demanded – the losses and gains in uncertain ecosystem services as a result of uncertain changes in habitat (the latter represented as red and green areas of Figure A4). Uncertainty would be expected to magnify problems with stakeholders perception of fairness addressed under (3) above.

5. **Restoration time lags and problems of discounting present and ecosystem service losses against future gains (Table 1A and Figure A4)**

Table 1A (EFTEC et al. 2010) shows how restoration times for different habitats and landscape features. A hypothesis is that more biodiverse and complex structured ecosystems have longer restoration times. For these systems there is greater likelihood that rehabilitation is completed and offsets credits verified after the development takes place. This is illustrated in Figure A4. Because interim losses in habitat and ecosystem services (location A) may occur many years in advance of complete rehabilitation at the offset site (location B). Discounting of future benefits against present costs imply that less habitat restoration may be required in future to compensate for a loss now, because the economic value of credits is made equivalent through discounting (EFTEC et al. 2010). Discount rates are also higher for riskier prospects.

Some closing considerations regarding equity and legitimacy

EFTEC et al. (2010) state that an advantage of banking systems is that a precondition can be to establish offset credits before sale takes place. Given the time lags in identifying habitats and restoration itself this requirement would push establishment of habitat banking farther into the future than the 10 years predicted in the report. At the same time financial and development sectors have an economic interest in pushing for earlier implementation, before credits have been generated. While habitat banking systems are developing ways to address discounting and speculation in this risk (EFTEC et al. 2010, case appendix), we think that habitat banking also faces problems in explaining the rationale of discounting and its biophysical consequences for offsets to non-financial and non-development stakeholders. An offsets scheme that delivers economically equivalent, rather than biophysical equivalent, offsets is unlikely to be perceived as neither precautionary nor equitable.

Figure A1. Habitat banking (biodiversity offset debit with ex post rehabilitation)

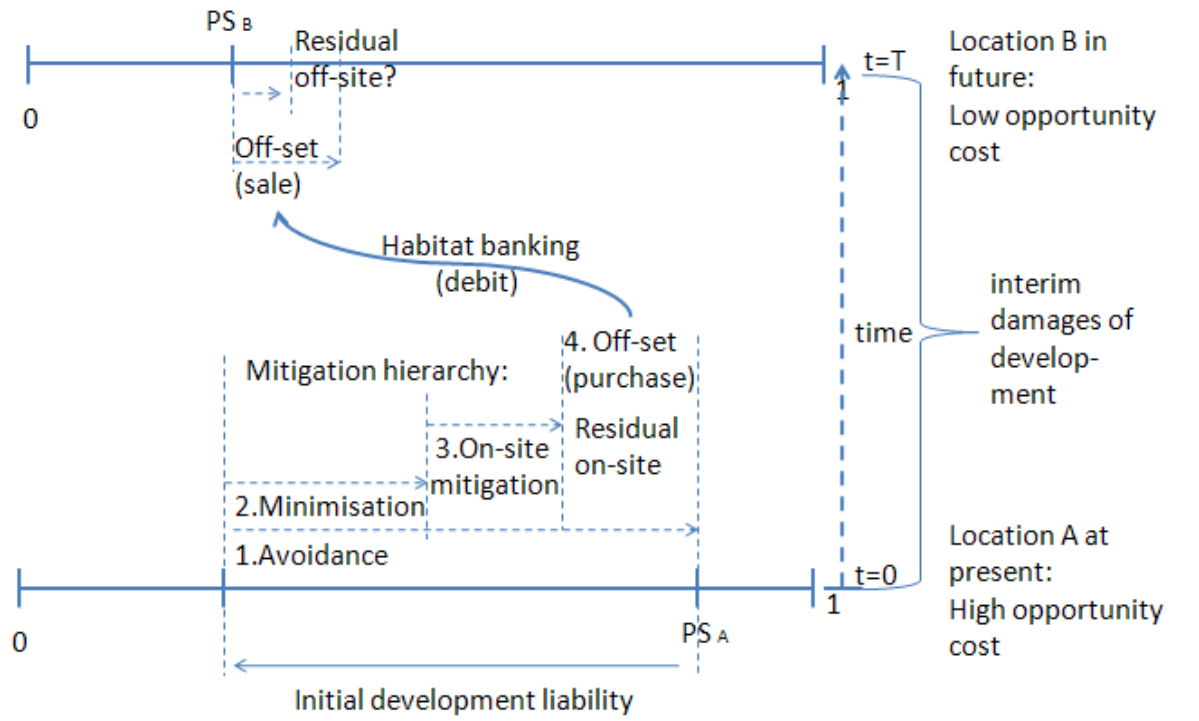

Figure A2. Habitat banking (biodiversity offset credit with ex ante rehabilitation)

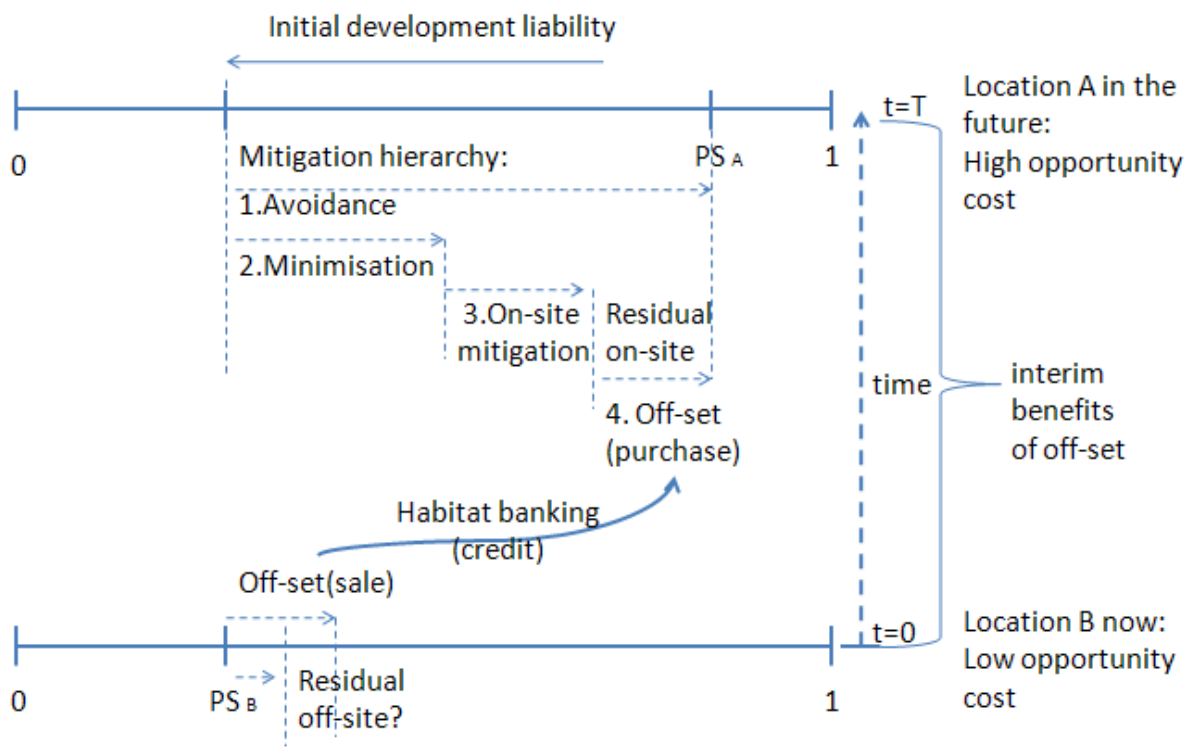

Figure A3 Interim habitat loss in habitat banking (no ecosystem dynamics)

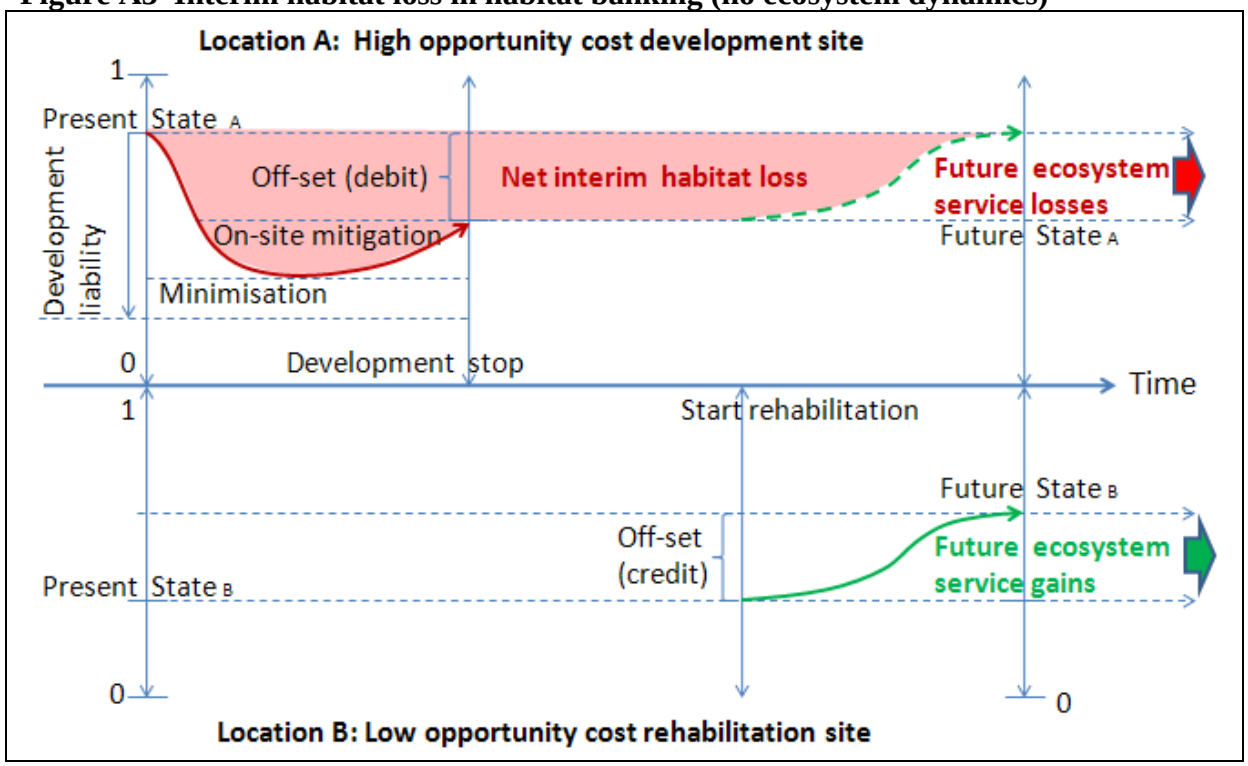

Figure A4. Equivalence of ecosystem services gains and losses with ecosystem dynamics

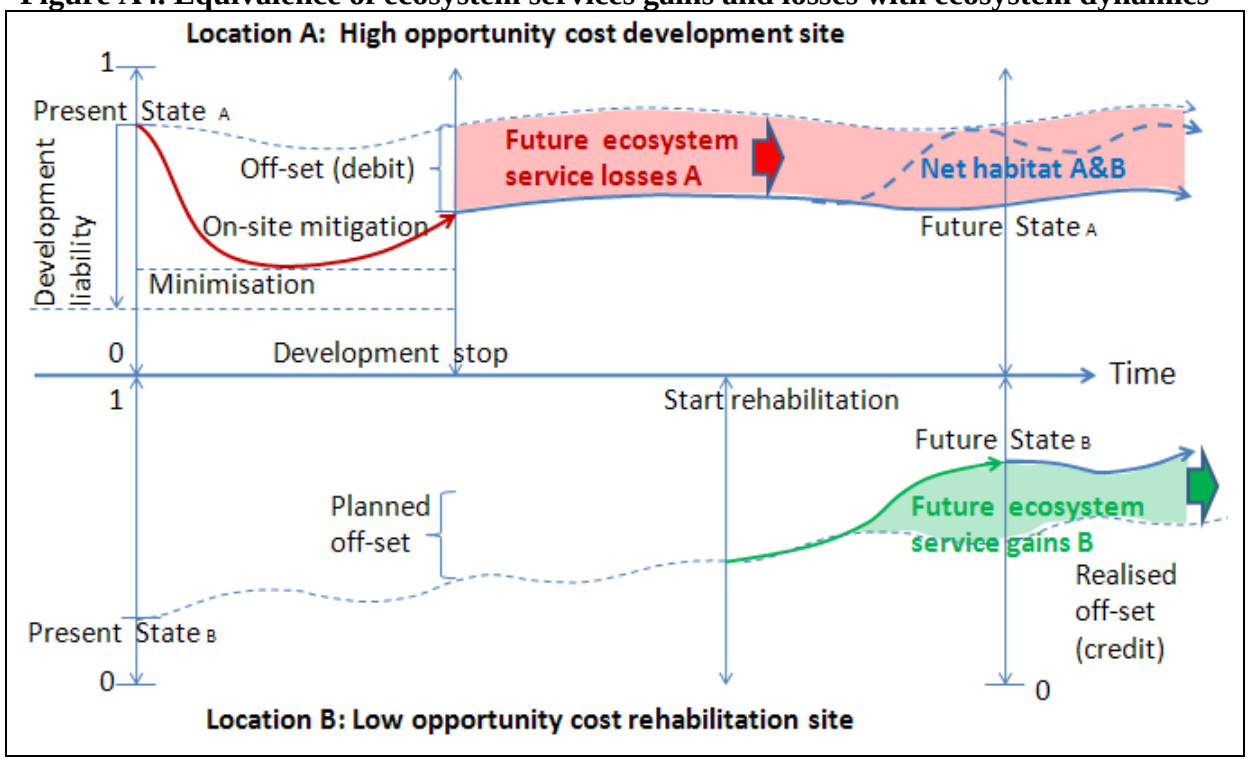

Table A1 Restoration time-scales for selected habitat types

Table 4.1. The feasibility of restoring selected habitat types and their relative time-scales		
Habitat	Time-scale	Notes
Temporary pools	1-5 years	May never support some faunas e.g. *Triops* and *Cheirocephalus*, but rapidly colonised by water beetles.
Eutrophic ponds	1-5 years	Creatable provided adequate water supply. Readily colonised by water beetles and dragonflies but faunas restricted to those with limited specialisms. Include ponds created for Great Crested Newts *Triturus vulgatus*.
Mudflats	1-10 years	Dependent upon position in tidal frame and sediment supply.
Eutrophic grasslands	1-20 years	Dependent upon availability of propagules.
Reedbeds	10-100 years	Will readily develop under appropriate water conditions.
Saltmarshes	10-100 years	Dependent upon availability of propagules, position in tidal frame and sediment supply.
Oligotrophic grasslands	20-100 years +	Dependent upon availability of propagules and limitation of nutrient input.
Chalk grasslands	50-100 years +	Dependent upon availability of propagules and limitation of nutrient input.
Yellow Dunes	50-100 years +	Dependent upon sediment supply and availability of propagules. More likely to be restored than re-created.
Heathlands	50-100 years +	Dependent upon nutrient loading, soil structure and availability of propagules. No certainty that vertebrate and invertebrate assemblages will arrive without assistance. More likely to be restored than re-created.
Grey dunes and dune slacks	100-500 years	Probably not recreatable but potentially restorable.
Ancient Woodlands	500 - 2000 years	No certainty of success if ecosystem function is sought - dependent upon soil chemistry and mycology plus availability of propagules. Restoration a possibility for plant assemblages but questionable for rarer invertebrates.
Vegetated shingle structures	500 - 5000 years	Dependent upon sediment supply and coastal processes. Essentially un-recreatable.
Blanket Bogs	1,000 - 5,000 years	Probably un-recreatable but will form in these timescales.
Raised Bogs	1,000 - 5,000 years	Probably un-recreatable but will form in these timescales.
Limestone Pavements	10,000 years	Un-recreatable but will form if a glaciation occurs.
Pingoes	10,000 years	Un-recreatable but will form if a glaciation occurs.
Turloughs	10,000 years	Un-recreatable but will form if a glaciation occurs.

Source: Morris and Barham, 2007

Source: cited in EFTEC (2010:80)

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Russian Federation

See also: https://www.cbd.int/doc/programmes/socio-eco/use/russia_2.ppt

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A Kyoto-like Market-based Protocol on Sustainable Use of Biodiversity

by

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Two major mutually interrelated global environmental problems have come to the fore: climate change and biodiversity depletion (Fig.1). Both are internationally addressed through their respective conventions, namely the Framework Convention on Climate Change (ECCC) and the Convention on Biological Diversity (CBD). The former has a market-based GHG (greenhouse gas) emission trading instrument, or the Kyoto Protocol. The other still needs, in our view, designing a similar market-based international mechanism.

Several initiatives in this direction have recently been made public. T**he Venezuelan President** announced at the World Summit for Sustainable Development (WSSD, Johannesburg, 2002) the establishment of an OPEC-like eco-services cartel that consisted of 12 countries and wanted developed countries and corporations to pay for access to a wide range of plants, animals and indigenous expertise in using them for health, food, and life support rather than exploiting them without recompense. The twelve countries included Brazil, China, Colombia, Costa Rica, Ecuador, India, Indonesia, Kenya, Mexico, Peru, South Africa and Venezuela. It was the core of the UN Mega-group of countries.

The **Katoomba Working Group** was set up. It is composed of experts from forestry, finance, environmental research and policy, government officials and other private and non-profit sectors from all regions of the world - Canada, China, Germany, Japan, Netherlands, the UK, USA, the World Bank, the Ford Foundation, IUCN, WWF, etc. The group promotes the global interest in markets for environmental services from forests and stresses growing recognition of two fundamental issues: (1) in general, forest degradation and the conversion of forest to alternative land uses is often more profitable, at least in the short-run, than forest stewardship; and (2) markets, in general, do not recognise or reward forest owners for the host of environmental services generated by forests that are beneficial to society, including carbon storage, watershed protection and biodiversity conservation.

The Katoomba group aims to spur development of markets and market-based instruments for forest ecosystem services. It points out that if some of the value of these social benefits could be returned to forest owners, there would be a double benefit: additional incentives for forest stewardship and conservation, and new sources of income for forest landholders.

Furthermore, in his speech at the WSSD, the **Russian prime-ministre** pointed out, in particular, the need for compensating global ecological services of ecological donor countries, adding that Russia is one of them. Debt-for-sustainable development swaps were mentioned as one such tool.

International experience (OECD, WTO) has so far been instrumental in classifying and discussing **environmental goods and services** (end-of-pipe technologies, such as services providing drinking water, waste, alternative energy, sewage and waste treatment, etc.) that such goods and services have well defined owners, their rights to them, values (prices). Both are movable. They are provided using traditional market mechanisms among companies and countries. Sometimes, transboundary aspects are involved, such as international supplies of drinking water (using tankers, pipelines, etc.), international trade in waste, including its treatment and return of decontaminated waste.

However, **ecological (ecosystem) goods and services** have got into the picture only recently. That was related to the creation of a new science – ecological economics, introduction of the total economic value notion, case studies in environmental valuation of renewables and biodiversity, the design of a UN integrated system of economic and

environmental accounting (UNEP, the UN Statistical Department). Intercountry comparisons of ecosystem services have been reflected in assessment of 'ecological footprints' (WWF). While ecological goods are movable, ecological services are not and are firmly tied to ecosystems. The world market is at present dominated by trade relating to produced and non-renewable natural capital, while renewable natural capital that is abundant in many developing and other nature dependant countries (it exceeds a share of producing capital) is largely undervalued and real trade in its goods and services is unjustly small.

International economic relations seem to operate largely with three kinds of currencies, namely, money, technologies, and ecological goods and services. The failure of traditional markets to adequately handle exchanges of ecosystem services to human produced wealth (goods and technologies) and money have resulted in the advent of new markets with specific market and trade instruments and trade commodities. For example, such a mechanism is envisaged in an agreement on the trade in CO_2 emission quotas and on accounting carbon sequestration by means of forest planting (the Kyoto Protocol).

The following issues are suggested for research and discussion:

1) global ecological services and goods (their notion, definition, taxonomy),
2) ecological property rights,
3) economic valuation of ecological services and goods,
4) exchanges in ecological services and goods, including market and market-based instruments.

Below is a list of major research and discussion items that can lead to a Kyoto-like market based protocol on sustainable use of biodiversity (fig.2).

1) Global ecological services and goods (their notion, definition, taxonomy),

The WRI classification (http://www.wri.org/wri/wr2000/goods_and_services.html) is suggested as a starting point. This classification is quite general and partial needing further development to be used operationally. It leaves out marine and mountain ecosystems to name but two, etc. For example, the WSSD stressed the necessity of enlisting indigenous peoples' expertise in regard to the use of living natural resources and biodiversity for human life support. The availability of and access to gene banks could also be considered.

The classification could take into account ecosystem values (direct, indirect, optional, inherited, etc.). The Kyoto protocol artificially limits the value of ecosystem services in time (only after 1990), and covers only carbon sequestration by new (after 1990) forests. The contribution of ecosystems to maintaining the Earth's biosphere or regional sustainability could be another criterion for classification. Ecosystem services important nationally and maintained nationally versus national ecosystem services of international and global importance that could be treated accordingly can also be considered. The classification should be useful for defining ecological property rights and values.

2) Ecological property rights

A spectrum of approaches can be considered based on ecosystemic, territorial, administrative boundaries or the ownership of land plots, water bodies, forests, habitats, etc. One may try to find some similarities with intellectual property rights, especially applicable for indigenous knowledge and experience. Protection of local indigenous community rights to the ecosystem knowledge and expertise; sovereign versus private ownerships. The Kyoto protocol seemingly prefers the sovereign property rights for global ecosystem services.

3) Economic valuation of ecological services and goods,

Environmental valuation can be discussed in physical and monetary terms. One publication argues that global ecoservices are equal to 1.1 times the global GDP in the 1990s. Is this indicator operationally useful? What volumes of trade in ecosystem goods and services can be expected? Which valuation methodology should be taken as a basic one – the UN SEEA, ecological footprints, total economic value, used/unused assimilating capacity, ecosystems biomass, etc.

4) Exchanges in ecological services and goods, including market and market-based instruments

The following issues can be discussed. Exchanges of ecosystem services for technologies, debt-for-nature (ecoservices) swaps, selling ecosystem services and goods (monetary exchanges). The volume of trade in ecosystem goods can be roughly assessed from the existing few publications. Three major currencies: money, technologies, and ecosystem services (goods). Trade in rights to bio-prospecting. Sanctions for eco-piracy? The trade in ecosystem goods is partially regulated by the CITES and in ecosystem services by the Kyoto protocol. The CBD does not cover these issues but has relevance to them. However, pharmaceutical and perfume companies largely make use of plants and animals that are not covered by the above conventions. Nowadays, some developing countries have initiated the practice of concluding agreements with transnational companies on bio-prospecting activity and benefit sharing from the activity that make use of biodiversity of the given country (see more at. The role of UNEP and WTO? Is there the need in a convention (a protocol to the Convention on biodiversity) on ecosystem goods and services? How other ecological goods and services that are not marketed at present but important for human life support and transition to sustainable development should be treated? Should a taxonomy table indicate what trade (exchange) mechanisms exist for different kinds of ecological goods and services? At present there is very little regulation of trade in ecological goods and services. CITES and the Kyoto protocol represent exceptions rather than the norm, and the CBD is only a framework, and does not provide actual regulations for transactions in these goods and services. It should also be noted that ecosystem services are beneficial to the country (ecosystem) of their origin, a neighboring region and the globe.

Could market based bilateral (multilateral?) agreements between internationally legal entities be enough to optimize (compensatory) payments for conserving natural ecosystems? Say, some (post) industrial countries that have lost their ecosystems (natural capital) for economic development can invest in conserving ecosystems not on their territory but concluding agreements with other nature-rich countries in which marginal ecosystem conservation (equivalent increments in ecosystem areas, biomass, bio-productivity and biodiversity) is less costly than in their countries. The cost of such contracts can be considered as a contribution to maintaining biospheric sustainability while costs per unit of ecosystem services can give a clue to their economic values. Is such an approach realistic bearing in mind that debt-for-nature swaps implicitly recognize it? Could this understanding be expanded beyond the DNS pattern? What other new ideas can be generated? It is interesting to note that the European countries did not make use of a compensatory mechanism (did not claim money) to cover damages to their ecosystems due to acid deposition from neighbouring countries, though tables of transboundary SO2 movements (acid rain inter-country balances) were made from which it was clear which countries and how much affect other (acid deposition recipient) nations.

In conclusion, it is suggested that the above coverage lead to a careful consideration of the issues raised before arriving to a definitive international instrument that could be an incentive to sustainable use of biodiversity and developing a market for renewable natural capital.

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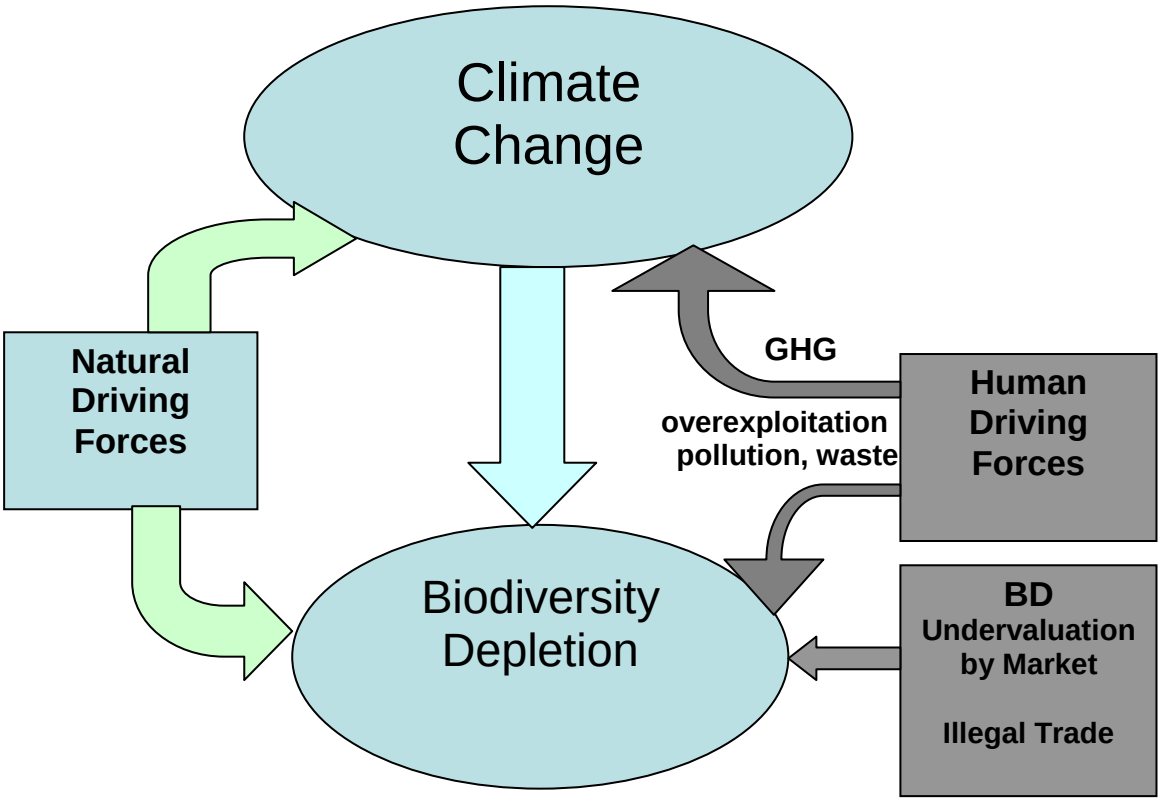

Fig.1 . Climate – Biodiversity Interactions

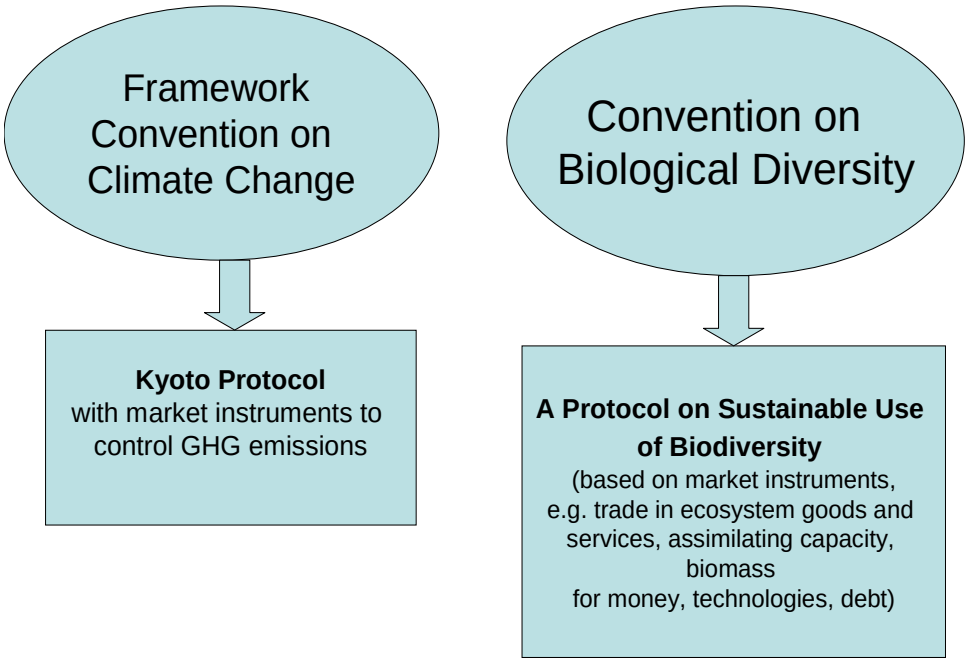

Fig. 2. The framework of a suggested Protocol on sustainable use of biodiversity

Organization for Economic Cooperation and Development

Information concerning Innovative Financial Mechanisms
Submission by the Organisation of Economic Co-operation and Development (OECD)

Pursuant to decision X/3, A, paragraph 8(c), in which the Conference of the Parties "*Invites* Parties, relevant organizations and initiatives, such as the World People's Conference on Climate Change and the Right of Mother Earth, to submit information concerning innovative financial mechanisms that have potential to generate new and additional financial resources as well as possible problems that could undermine achievement of the Convention's three objectives, not later than 30 June 2011, for the Executive Secretary to compile and present a synthesis of this information", please find the following submission, on behalf of the OECD Secretariat.

Given ongoing and projected trends in biodiversity loss and degradation, there is an urgent need for both: (1) greater levels of finance for biodiversity conservation and sustainable use, and (2) more efficient use of available finance in existing programmes.

Well-designed Innovative Financial Mechanisms (IFMs) would ideally meet the following criteria (adapted from OECD 2010[1]):

1. *Remove perverse incentives*: For an IFM to produce clear and effective incentives any conflicting market distortions, such as environmentally-harmful subsidies, should be removed.

2. *Clearly define property rights*: The individual or community whose management/use decisions affect the provision of biodiversity/ecosystem services must have clearly defined and enforceable property rights over the resource in question. Otherwise, risks associated with, for example, illegal logging or land appropriation will undermine the ability of the individual or community to provide the ecosystem service, rendering the IFM ineffective.

3. *Clearly define IFM goals and objectives*: Clear IFM goals help to guide the design of the programme, enhance transparency and avoid *ad-hoc* political influence.

4. *Develop a robust monitoring and reporting framework*: Monitoring and reporting of biodiversity and ecosystem services is fundamental, enabling performance assessment of an IFM, and allowing for improvements over time.

[1] *Paying for Biodiversity: Enhancing the Cost-Effectiveness of Payments for Ecosystem Services.*

5. *Identify buyers and ensure sufficient and long-term sources of financing*: Whether the buyers of services are the beneficiaries themselves, or third Parties acting on behalf of the beneficiaries, the finance must be sufficient and sustainable to ensure that the objective of the IFM can be achieved.

6. *Identify sellers and target ecosystem service benefits*: Accounting for spatial variation in ecosystem service benefits via economic valuation, benefit scoring, and mapping tools allows payments to be prioritised to those areas that provide the highest benefits. If the total IFM budget available is limited, this can substantially increase the cost-effectiveness of the programme, in comparison to say, allocating payments on a first-come first-served basis.

7. *Establish baselines and target IFMs to biodiversity and ecosystem services that are at risk of loss, or to enhance their provision*: An IFM should only make payments for biodiversity/ecosystem services that are additional to the business-as-usual baseline (*i.e.* in the absence of the mechanism).

8. *Differentiate payments based on the opportunity costs of ecosystem service provision*: IFMs that reflect ecosystem providers' opportunity costs via differentiated payments are able to achieve greater aggregate ecosystem service provision per unit cost.

9. *Consider bundling or layering multiple ecosystem services*: Joint provision of multiple ecosystem services can provide opportunities to increase the benefits of an IFM, while reducing transaction costs, especially if finance for multiple benefits is available. The potential synergies and trade-offs involved in joint ecosystem service provision need to be identified.

10. *Address leakage*: Leakage occurs when the provision of biodiversity/ecosystem services in one location increases pressures for conversion in another. If leakage risk is expected to be high, the scope of the monitoring and accounting framework may need to be expanded to enable assessment of the potential leakage so that appropriate measures can be introduced to address it.

11. *Ensure permanence*: Events such as forest fires or illegal logging may undermine the ability of a landholder to provide an ecosystem service as stipulated in any IFM agreement. If these risks are high, this will impede the effective functioning of an IFM. Insurance mechanisms can be introduced to address this.

12. *Deliver performance-based payments and ensure adequate enforcement*: Ideally, payments should be ex-post, conditional on biodiversity/ecosystem service performance. When this is not feasible, effort-based payments (such as changes in management practices) are a second best alternative, provided that changes in ecosystem management practices will bring about the desired change in service provision. Sufficient disincentives to breaching the IFM agreement must also be provided and enforced, especially if payments are based on efforts rather than on actual biodiversity/ecosystem service delivery.

Relevant OECD Publications, Reports and Workshops on Innovative Financial Mechanisms

Payment for ecosystem services:

- OECD (2010). *Paying for Biodiversity: Enhancing the Cost-Effectiveness of Payments for Ecosystem Services.*

Drawing on the literature concerning effective PES and on more than 30 case studies from both developed and developing countries, this book aims to identify good practice in the design and implementation of PES programmes to enhance their environmental and cost effectiveness. It addresses the following questions: Why are PES useful and how do they work? How can they be made most effective environmentally and how can their cost-effectiveness be maximised? What are the different potential sources of finance for PES programmes, and how can they be secured? What are the lessons learned from existing PES programmes and insights for future programmes, including international PES?

- OECD Workshop on Enhancing the Cost-Effectiveness of Payments for Ecosystem Services (PES) March 2010

Biodiversity offset mechanisms:

- OECD Workshop on Mobilising Private Sector Finance for Biodiversity Conservation and Sustainable Use, March 2011
- OECD Workshop on Innovative International Financing for Biodiversity Conservation and Sustainable Use July 2009

Environmental fiscal reforms:

- OECD (2003). "Perverse Incentives in Biodiversity Loss" [ENV/EPOC/GSP(2003)2/FINAL]

Markets for green products:

- OECD (2011). *Greening Household Behaviour: The Role of Public Policy*.

Household consumption patterns and behaviour have an impact on stocks of natural resources, environmental quality and climate change. This is expected to increase significantly in the future. In response, governments have introduced a variety of measures to encourage people to take into consideration the environmental impact of their purchases and practices. These may include environmentally related taxes, energy performance standards for homes, carbon dioxide emission labels for cars, and financial support to purchase solar panels, among others. Nevertheless, understanding and influencing household behaviour remains a challenge for policy makers. This publication presents the main results and policy implications of an OECD survey of more than 10 000 households in 10 countries: Australia, Canada, the Czech Republic, France, Italy, Korea, Mexico, the Netherlands, Norway and Sweden. It offers new insight into what policy measures really work, looking at what factors affect people's behaviour towards the environment in five areas: water use, energy use, personal transport choices, organic food consumption, and waste generation and recycling.

Biodiversity in international development finance:

- OECD (2010) Policy Statement on Integrating Biodiversity and Associated Ecosystem Services into Development Co-operation.

- OECD (2009) *Natural Resources and Pro-Poor Growth: The Economics and Politics.*

Natural capital constitutes a quarter of total wealth in low-income countries. For the poorest in these countries - notably those living in rural areas - soil, water, fisheries, forests and minerals are the principal sources of income. Thus, to achieve pro-poor economic growth, low-income countries should build on the natural resource assets of the poor. This publication demonstrates that natural resources can contribute to growth, employment, exports and fiscal revenues. It highlights the importance of policies encouraging the sustainable management of these resources. Moreover, it emphasises the need to address the political challenges of natural resource management for long-term pro-poor economic growth.

Biodiversity in climate change funding:

- OECD (2008). "Promoting Biodiversity Co-Benefits in REDD". ENV Working Paper No. 11.

- OECD Workshop on Incentives to Capture the Biodiversity and Carbon Benefits for Reducing Deforestation March 2008

Further information on OECD work on biodiversity is available at www.oecd.org/env/biodiversity

OECD Databases of Relevance to Biodiversity Finance

On ***innovative finance mechanisms for biodiversity*:**

The OECD/EEA has a database on instruments used for environmental policy and natural resources management: www.oecd.org/env/policies/database

This database contains information on:

- Environmentally related taxes, fees, and charges
- Tradable permits
- Deposit-refund schemes
- Environmentally motivated subsidies
- Voluntary approaches

Each instrument is linked to one or more categories of environmental issues (e.g. water pollution, climate change, natural resource management). The category "Natural Resource Management" covers issues relevant to biodiversity.

On ***biodiversity-related aid***:

Since 1998 the Development Assistance Committee (DAC) has monitored aid targeting the objectives of the Rio Conventions through its Creditor Reporting System (CRS) using the so-called "Rio markers". The Rio marker on biodiversity was established by the DAC in close collaboration with the Secretariat of the United Nations Convention on Biodiversity (UNCBD) to track aid flows in support of developing countries' efforts to implement the Convention.

Biodiversity-related aid is defined as activities that promote at least one of the three objectives of the Convention: the conservation of biodiversity, sustainable use of its components (ecosystems, species or genetic resources), or fair and equitable sharing of the benefits of the utilisation of genetic resources.

The full definition for the biodiversity marker, data on biodiversity-related aid (ODA aggregates by donor and list of underlying activities) and statistical briefs are available at:
www.oecd.org/dac/stats/rioconventions

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ABSTRACT

Reducing Emissions from Deforestation and Forest Degradation (REDD) in developing countries is a new financial mechanism that is being proposed for the post-2012 climate change regime under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC). Successful agreement on a future REDD mechanism would represent a substantial and unprecedented development in the creation of an international mechanism to help internalise the carbon-related ecosystem services from forests and could make a significant contribution to addressing the global climate change challenge.

Forests also play a key role in the provision of biodiversity, as well as other non-carbon ecosystem services. The Bali Action Plan recognises that action to support REDD "can promote co-benefits and complement the aims and objectives of other relevant international conventions and agreements". A notable example is that of the Convention on Biological Diversity.

This report examines how biodiversity co-benefits in REDD can be enhanced, both at the design and implementation level. It discusses potential biodiversity implications of different REDD design options that have been put forward in the international climate change negotiations and proceeds by examining how the creation of additional biodiversity-specific incentives could be used to complement a REDD mechanism, so as to target biodiversity benefits directly.

Key design elements of a REDD mechanism that need to be agreed upon, and are likely to have implications for biodiversity, include: the scope of the mechanism; financing; the establishment of baselines/reference levels; and permanence issues, amongst others. For example, a market-based approach to REDD financing (rather than a fund-based approach) is likely to generate substantially larger volumes of financing (by directly engaging the private sector), which would enable more REDD activities, greater forest areas being conserved, and hence larger biodiversity co-benefits.

Overall, a well-designed REDD mechanism is likely to deliver substantial biodiversity co-benefits since avoided deforestation and degradation implies a decline in habitat destruction and thus in biodiversity loss. However, some of the international REDD design elements may pose potential risks to biodiversity, for example via afforestation and reforestation activities that resulted in mono-plantations, and appropriate safeguards may be needed.

At the implementation level, further efforts can help ensure that biodiversity co-benefits can be mainstreamed into REDD activities in an efficient and informed manner. For example:

- Some international financing would be well-invested in economically evaluating and geographically mapping biodiversity and ecosystem services benefits as this can provide an important input to national REDD planning and implementation. An improved database on national biodiversity will increase the likelihood of using this information to achieve and maximise REDD co-benefits.

- If a REDD mechanism is successful in avoiding deforestation and degradation, it could free up financial biodiversity resources from areas where high carbon and high biodiversity benefits

coincide. Thus for OECD countries, biodiversity-targeted international funding should be flexible and seek to avoid double payments. Rather, biodiversity-targeted funding should aim to complement REDD financing *e.g.* focussing in areas with high biodiversity and low carbon benefits.

- The on-going REDD demonstration activities (or pilots), which are encouraged under the UNFCCC 2007 Bali Action Plan as a means to prepare and obtain experience for future REDD programmes, provide a valuable opportunity for biodiversity policy-makers to promote and financially support biodiversity monitoring, reporting and verification in REDD demonstration activities to assess biodiversity performance over time. This will enable the analysis, comparison, and evaluation of different approaches and methods used to promote biodiversity co-benefits in REDD. Lessons learned during the implementation of these REDD demonstration activities can ultimately feed into the international and national level policy-making processes.

- Biodiversity policy-makers may wish to consider the creation of a technical expert group on Promoting REDD Biodiversity Co-benefits to establish best-practice guidelines and principles, including on indicators for biodiversity. Such a group could in effect develop a "how-to" tool-kit to assist developing countries implementing REDD activities at the national, regional and/or local level.

In addition to these design and implementation considerations for enhancing biodiversity *co-benefits* in REDD, additional policies and incentives can be created to target biodiversity *benefits* directly, as a complement to any future REDD mechanism. This would involve making multiple payments for the multiple benefits provided by forests. These payments for biodiversity conservation can be mobilised via voluntary or regulatory approaches, and can be designed as either market- or fund-based instruments. Several voluntary initiatives have recently emerged to bundle payments for both carbon and biodiversity in forestry projects, such as the Climate, Community and Biodiversity Alliance (CCBA), PlanVivo, Carbon Fix, amongst others. It is important to note however that while these initiatives can provide valuable insights and lessons learned on how to bundle these benefits, voluntary schemes are unlikely to provide the scale necessary to create a global demand for biodiversity and to impact land-use decisions fundamentally. Just as demand for carbon allowances, certified emission reductions from the Clean Development Mechanism - and potentially REDD credits in the future - is driven by legally-binding GHG emission reduction commitments and regulated via an international carbon market, large scale international demand for biodiversity would come from large scale regulatory biodiversity policies.

JEL Classification: Q23, Q57
Keywords: biodiversity conservation, climate change deforestation, cost-benefit analysis, environmental economics

RESUMÉ

La réduction des émissions liées à la déforestation et à la dégradation des forêts (REDD) dans les pays en développement est un nouveau mécanisme financier proposé pour le régime climatique post-2012 sous l'égide de la Convention-cadre des Nations Unies sur les changements climatiques (CCNUCC). L'obtention d'un accord sur un futur mécanisme de REDD constituerait un progrès majeur et inédit vers la création d'un dispositif international visant à internaliser les services écosystémiques forestiers liés au carbone, et pourrait sensiblement contribuer à relever le défi du changement climatique global.

Les forêts jouent également un rôle essentiel pour assurer la biodiversité, et pour fournir d'autres services écosystémiques non liés au carbone. Le Plan d'action de Bali reconnaît que l'action en faveur de la REDD « peut avoir des retombées positives et servir les buts et objectifs d'autres conventions et accords internationaux pertinents ». Un exemple notable est celui de la Convention sur la diversité biologique.

Le présent rapport examine les moyens de renforcer les avantages connexes pouvant être tirés de la REDD sur le plan de la biodiversité, tant au niveau de la conception qu'à celui de la mise en œuvre. Il analyse les répercussions potentielles sur la biodiversité des différents dispositifs de REDD envisageables qui ont été avancés dans les négociations internationales sur le changement climatique et poursuit en examinant comment compléter la REDD en créant des incitations supplémentaires spécifiquement axées sur la biodiversité, de manière à cibler directement les avantages liés à celle-ci.

Les principaux aspects de la conception d'un mécanisme de REDD sur lesquels il reste à trouver un accord, et qui sont susceptibles d'avoir des répercussions sur la biodiversité, sont notamment la portée du mécanisme, son financement, les niveaux de base ou de référence, la permanence, etc. Par exemple, une approche du financement de la REDD s'appuyant sur le marché (plutôt que sur un système de fonds) permettra vraisemblablement d'obtenir des ressources financières beaucoup plus importantes (en mobilisant directement le secteur privé), d'où un plus grand volume d'activités de REDD, une superficie accrue des zones forestières conservées, et par conséquent des avantages connexes plus importants sur le plan de la biodiversité.

Dans l'ensemble, un mécanisme de REDD bien conçu sera susceptible de procurer des avantages connexes substantiels sur le plan de la biodiversité, dans la mesure où le ralentissement de la déforestation et de la dégradation contribue nécessairement à freiner la destruction des habitats et par conséquent la perte de biodiversité. Toutefois, certains des aspects de la conception d'un mécanisme international de REDD peuvent présenter des risques potentiels pour la biodiversité, par exemple les activités de boisement et de reboisement qui aboutissent à des mono-plantations, aussi peut-il être nécessaire de prévoir des mesures de sauvegarde appropriées.

Au niveau de la mise en œuvre, une poursuite des efforts pourrait contribuer à ce que les avantages connexes liés à la biodiversité puissent être pleinement intégrés aux activités de REDD de manière efficiente et réfléchie. Par exemple :

- Certains financements internationaux trouveraient un emploi fructueux dans l'évaluation économique et la cartographie géographique des avantages liés à la biodiversité et aux services écosystémiques, ce qui apporterait une contribution appréciable à la planification et à la mise en œuvre de la REDD au plan national. Si le socle d'informations sur la biodiversité à l'échelle

nationale est plus solide, on aura plus de chances d'obtenir et d'optimiser les avantages connexes en utilisant ces informations.

- Si un mécanisme de REDD parvient à éviter la déforestation et la dégradation des forêts, il pourra libérer des ressources financières pour la conservation de la biodiversité dans les zones où coïncident des avantages importants sur le plan du carbone et de la biodiversité. Ainsi, ce qui concerne les pays de l'OCDE, les financements internationaux en faveur de la biodiversité devraient être flexibles et s'efforcer d'éviter les cumuls de paiements. Au contraire, ces paiements devraient viser à compléter les financements au titre de la REDD, par exemple en étant axés sur les zones où les avantages en termes biodiversité sont importants et où ceux liés au carbone sont faibles.
- Les activités de démonstration (ou pilotes) de REDD qui sont actuellement menées, conformément aux recommandations de la CCNUCC dans le Plan d'action de Bali de 2007 en préparation des programme futurs de REDD et afin d'acquérir de l'expérience dans ce domaine, offrent aux responsables de l'élaboration des politiques de biodiversité une bonne occasion de promouvoir et soutenir financièrement les opérations de suivi, de notification et de vérification de la biodiversité, dans le cadre d'activités de démonstration de REDD qui permettront d'évaluer les résultats en matière de biodiversité au cours du temps. On pourra ainsi analyser, comparer et évaluer différentes approches et méthodes utilisées pour promouvoir les avantages connexes de la REDD sur le plan de la biodiversité. Les enseignements tirés de la mise en œuvre de ces activités de démonstration de REDD pourront à terme être pris en compte dans les processus d'élaboration des politiques à l'échelle nationale et internationale.
- Les responsables de l'élaboration des politiques de biodiversité pourraient envisager la création d'un groupe d'experts techniques sur la promotion des avantages connexes de la REDD liés à la biodiversité, qui serait chargé d'établir des lignes directrices et de définir des principes de bonnes pratiques, notamment sur les indicateurs de biodiversité. Un groupe de ce type pourrait de fait mettre au point une « trousse à outils » afin d'aider les pays en développement à mettre en œuvre des activités de REDD au niveau national, régional et/ou local.

En dehors de ces aspects de conception et de mise en œuvre à prendre en considération pour renforcer les *avantages connexes* de la REDD sur le plan de la biodiversité, des politiques et incitations supplémentaires peuvent être créées afin de cibler directement les *avantages* liés à la biodiversité, et de compléter ainsi un éventuel dispositif futur de REDD. Il s'agirait de verser de multiples paiements pour les multiples avantages fournis par les forêts. Ces paiements au titre de la conservation de la biodiversité peuvent être mobilisés au moyen d'approches volontaires ou réglementées, et conçus comme des instruments fondés soit sur les mécanismes du marché, soit sur un système de fonds. Plusieurs initiatives volontaires récentes ont consisté à grouper les paiements liés au carbone et à la biodiversité dans le cadre de projets forestier, notamment l'Alliance climat, communauté et biodiversité (CCBA), le Plan Vivo, CarbonFix, etc. Il importe toutefois de noter que si ces initiatives peuvent apporter de précieux éclairages et enseignements sur la façon de grouper ces avantages, des dispositifs volontaires ne permettront sans doute pas d'atteindre l'échelle nécessaire pour créer une demande mondiale de biodiversité et modifier fondamentalement les décisions en matière d'utilisation des terres. Tout comme la demande de crédits de carbone, de réductions certifiées des émissions au titre du Mécanisme pour un développement propre - et potentiellement de crédits de REDD à l'avenir - est déterminée par des engagements juridiquement contraignants de réduction des émissions de GES, et régulée par un marché international du carbone, seules des politiques de réglementation de la biodiversité à grande échelle donneront lieu à une demande internationale de biodiversité de grande ampleur.

Classification JEL : Q23, Q57
Mots clés : conservation de la biodiversité, changement climatique, déforestation, analyse coûts-avantages, économie de l'environnement

FOREWORD

This report on "Promoting Biodiversity Co-Benefits in REDD" was developed following an OECD joint workshop of the Working Group on Economic Aspects of Biodiversity (WGEAB) and the Annex I Expert Group (AIXG) on the UNFCCC on "Incentives to Capture the Carbon and Biodiversity Benefits for Reducing Deforestation: Linkages, Synergies and Limitations" held on March 26, 2008 (www.oecd.org/env/biodiversity) . Building on presentations and discussion from delegates and experts, a draft report was prepared for the OECD WGEAB meeting on July 2, 2009. The present report incorporates the feedback received from WGEAB delegates that have overseen this work.

This report has been authored by Katia Karousakis. In addition to WGEAB delegates, the author is grateful to Andreas Tveteraas, Markus Lehmann, Tim Christophersen, Jaime Webb, John Scott and Bas Clabbers (all in their personal capacity), as well as Helen Mountford and Jan Corfee-Morlot, for valuable input and feedback.

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1. Introduction

Reducing Emissions from Deforestation and Forest Degradation (REDD) in developing countries is a new financial mechanism that is being proposed for the post-2012 climate change regime under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC). Successful agreement on a future REDD mechanism would represent a substantial and unprecedented development in the creation of an international mechanism to help internalise the costs of losing the carbon-related ecosystem services from forests and could make a potentially significant contribution to addressing the global climate change challenge.

Forests play a key role in tackling climate change. Emissions from land use change, primarily deforestation, are estimated to contribute up to 17% of global greenhouse gas (GHG) emissions (IPCC, 2007) – the third largest source of anthropogenic GHG emissions after energy supply and industrial activity.[1] Forests also play a key role in the provision of biodiversity (as well as other non-carbon ecosystem services), harbouring at least 50% of the global terrestrial richness in species, mainly in the tropics (MEA, 2005). As REDD discussions under the UNFCCC have evolved, the biodiversity community has shown increasing interest in the potential for REDD to contribute to biodiversity conservation and sustainable use.

This report examines the possible synergies between the role of forests in mitigating climate change and the role of forests in biodiversity conservation and sustainable use. The aim is to identify opportunities for how biodiversity co-benefits of REDD can be maximised at the international, national and local level. The paper also examines how additional biodiversity incentives could be created, to complement a REDD mechanism, so as to further capture and market biodiversity benefits directly.

The report is organised as follows: Section 2 provides an overview of the evolution of REDD under the UNFCCC, and potential implications of different REDD design options on biodiversity. Section 3 examines how biodiversity co-benefits in REDD could be maximised and provides examples of tools to facilitate its implementation. Section 4 discusses synergies that could be harnessed to go beyond the biodiversity co-benefits in REDD, existing initiatives that are underway, and how these could be scaled-up and improved. Section 5 concludes.

2. REDD and Biodiversity

2.1 Background: The Evolution of REDD under the UNFCCC

The ultimate objective of the 1992 UNFCCC is to stabilise GHG concentrations at a level that would prevent dangerous anthropogenic interference with the climate system. Under the 1997 Kyoto Protocol, most Annex I (or industrialised) countries agreed to nationally binding quantified emission limitation and reduction objectives (QELROs)[2] for the first commitment period (2008 to 2012). To lower the aggregate costs of achieving the emission targets, the Kyoto Protocol allows Annex I Parties to utilise a number of flexible mechanisms, including under Article 12, allowing Annex I Parties to invest in emission reduction projects (*i.e.* offsets) in developing countries via the Clean Development Mechanism (CDM). With respect

[1] To reach a stabilisation of GHG emissions in the atmosphere at a concentration of e.g. 450ppm CO_2e, the Eliasch Review (2008) argues forests will be an essential element to attain this target. Current studies also suggest that REDD is likely to be low-cost mitigation option relative to other GHG emission reduction alternatives (e.g. IPCC, 2007; Kindermann *et al.* 2008).

[2] Including emissions from the Land Use, Land Use Change and Forestry (LULUCF) sector.

to the forestry sector, only afforestation and reforestation projects are currently eligible under the CDM. Avoided deforestation was not included due to concerns with *inter alia* adequacy of monitoring capabilities, and the ability to ensure additionality.[3]

At the UNFCCC 11th Conference of Parties (COP-11; December, 2005) Papua New Guinea proposed to integrate reducing emissions from deforestation (RED) in developing countries into the post-2012 climate change regime. A formal process was subsequently launched whereby Parties were invited to consider issues "…relating to reducing emissions from deforestation in developing countries, focusing on relevant scientific, technical and methodological issues, and the exchange of information and experiences, including policy approaches and positive incentives" for potential recommendation to the UNFCCC at COP-13 (December, 2007). The Bali Action Plan, adopted by Parties at COP-13, mandates Parties to negotiate a post-2012 instrument, including possible financial incentives for forest-based climate change mitigation actions in developing countries. COP-13 also adopted a decision on "Reducing emissions from deforestation in developing countries: approaches to stimulate action".[4] This decision encourages Parties to explore a range of actions, identify options and undertake efforts, including demonstration activities, to address the drivers of deforestation and forest degradation. The scope of RED was thus extended to include forest degradation (REDD). The REDD demonstration activities (*i.e.* pilot activities) in developing countries are intended as a means to obtain practical experience and generate lessons learned to feed into any post-2012 REDD mechanism. More recently, the notion of REDD was expanded to include conservation, sustainable forest management, and enhancement of carbon stocks, as listed in the Bali Action Plan (Decision 1/CP.13), and is collectively referred to as 'REDD-plus'.[5]

Although REDD is necessarily focused on addressing carbon emissions, the Bali Action Plan recognizes that actions to support REDD "can promote co-benefits and may contribute to achieving the aims and objectives of other relevant international conventions and agreements" (Decision 2/CP.13). A notable example is that of the Convention on Biological Diversity.

2.2 REDD Design Options and Potential Implications for Biodiversity

The REDD negotiation process is still underway and will ultimately need to be integrated into any wider climate agreement reached in Copenhagen (UNFCCC COP-15; December 2009) and beyond.[6] There are still a number of REDD methodological and technical issues that remain to be resolved (see Karousakis and Corfee-Morlot, 2007). Key design elements of a REDD mechanism that need to be agreed upon, which are likely to have implications for biodiversity, include: the scope of the mechanism; financing; the establishment of baselines/reference levels; permanence; gross vs. net deforestation; and how local communities are included in REDD. Each of these international design elements are examined in turn below.

[3] *i.e.* that emission reductions achieved as a result of a project are additional to what would have occurred in the business-as-usual counter-factual.

[4] Decision 2/CP.13

[5] Ad Hoc Working Group on Long-term Cooperative Action under the Conventions (AWG LCA) Chair proposal of March 2009, FCCC/AWGLCA/2009/4. The draft REDD text prepared for the COP-15 negotiations in Copenhagen is contained in Non-paper No. 39. http://unfccc.int/meetings/ad_hoc_working_groups/lca/items/5012.php

[6] Key issues for agreement on a post-2012 climate change regime include enhanced mitigation commitments and actions by developed countries, and nationally appropriate mitigation actions in developing countries, taking into account differences in national circumstances.

2.2.1 Scope: REDD and REDD-plus

Any future REDD mechanism that addresses emissions from deforestation and forest degradation in developing countries is expected to have significant positive impacts on biodiversity since a decline in deforestation and degradation implies a decline in habitat destruction and thus in biodiversity loss. At the global scale for example, Turner *et al*. (2007) examine how ecosystem services (including climate regulation) and biodiversity coincide. Overall their findings suggest greatest synergy in tropical forests. At the national and local scale, achieving REDD in areas of both high carbon stocks and high biodiversity can contribute to climate change mitigation and further enhance co-benefits related to biodiversity conservation and sustainable use.

A REDD-plus mechanism that also encompasses conservation, sustainable forest management, and the enhancement of carbon stocks could have additional positive impacts on biodiversity, in particular where this is achieved through the appropriate restoration of degraded forest ecosystems and forest landscapes. If afforestation and reforestation (A/R) activities are also included in a future REDD mechanism, biodiversity benefits could arise from incentives to regenerate forests in previously deforested areas and increased connectivity between forest habitats. Moreover, the use of mixed native forest species can yield multiple benefits for biodiversity. In contrast, afforestation and reforestation activities that resulted in mono-plantations and the potential use of invasive alien species in plantations could have adverse impacts on biodiversity (CBD, 2009). There is a need therefore for safeguards to avoid potential negative effects.

2.2.2 Financing REDD: Market-based, fund-based and phased approaches

There are currently three prevailing proposals to generate REDD financing: Market-based approaches, fund-based approaches and phased approaches.[7] These have implications for the promotion of biodiversity co-benefits in a REDD framework and for the involvement of possible stakeholders in the decision-making processes.

Market-based approaches

If REDD were financed via the international carbon market, REDD credits would need to be fungible with existing Assigned Amount Units (AAUs) under the Kyoto market.[8] The unit of exchange would therefore be in tonnes of carbon or equivalents thereof (tCO_2e). Demand for these REDD credits would be generated by the regulated international carbon market and the market would drive investment to the least-cost carbon mitigation options. Market-based approaches to REDD are likely to mobilise higher levels of sustainable and long-term financing, due to their ability to fully engage the private sector. Thus the more finance available for REDD, the greater the area of forests conserved and hence the larger the biodiversity co-benefits are likely to be.

[7] In the pilot and demonstration activities, in particular for the REDD 'readiness' phase (*i.e.* structural and regulatory preparations and capacity building), predominantly fund-based grants are used, which might increasingly be accompanied by loans (e.g. when World Bank Forest Investment Programme becomes operational). Private sector investments might further complement the available funding during the REDD readiness phase, if an agreement on REDD is reached at UNFCCC COP-15.

[8] REDD credits could also be fungible with permits/allowances under existing (domestic) emission trading schemes such as the European Union Allowances (EUAs) under the EU Emissions Trading Scheme.

Depending on how REDD baselines[9] are determined (*i.e.* national vs. sub-national[10] and project level – see Section 2.2.3), different stakeholders could prioritise REDD activities so as to promote biodiversity co-benefits.[11]

Fund-based approaches

Fund-based approaches for REDD can be designed to disburse finances based on objectives and criteria established by donor (and host) countries. For example, whereas financing from the carbon market would necessarily deliver emission reductions, fund-based approaches to REDD could be used to finance emissions reductions and/or to support capacity-building needs in developing countries that would enable REDD markets to work.

How the funds are generated can have implications for how the funds should be disbursed. Current proposals for generating REDD funds include voluntary contributions from national budgets (*e.g.* as with ODA), auctioning allowances, levies on emission reduction units from joint implementation projects, and taxes on carbon-intensive commodities and/or international transport emissions.

- If funds for REDD were mobilised via central coffers, then governments could in theory disburse the money any way they wished[12], including by prioritising REDD activities in areas with high biodiversity co-benefits (and thus enhancing cost effectiveness in forest investments). Though this may imply greater flexibility for governments to pursue specific objectives, it is generally recognised that reliance on national contributions on a voluntary basis is unlikely to mobilise sufficient, predictable and long-term sources of financing that is needed for REDD climate change mitigation (and hence therefore nor for maximising biodiversity conservation co-benefits in REDD).[13]

- If alternatively, funds were generated via the auctioning of AAUs for example, and the objective of the REDD fund-based mechanism were to extend *beyond* biodiversity co-benefits (see Section 4 for discussion), then GHG polluters would be bearing the costs of biodiversity conservation in addition to the costs of GHG emission reductions. This is not in line with the polluter pays principle. Ideally, one would want those causing biodiversity loss/damage to be paying (and thus internalising) these costs.

Phased approaches

More recently, several Parties have proposed the use of a phased approach for REDD financing[14], whereby different sources of financing would be mobilised depending on developing country national

[9] A baseline is the reference level below which emission reductions are credited (or paid for).

[10] Sub-national refers to States or provinces, or regions within countries.

[11] There are also ways in which additional biodiversity benefits could be bundled with REDD credits (see Section 4).

[12] This also depends on whether ODA REDD funding were disbursed bilaterally or multilaterally. If via the latter, Parties may well set up eligibility criteria which would need to be agreed upon at the international level (see Karousakis and Corfee-Morlot, 2007 for further discussion on REDD eligibility criteria).

[13] See OECD 2008 DAC CRS for information on ODA statistics on biodiversity- and climate-related aid. Biodiversity-related bilateral aid by DAC members in 2005/2006 amounted to USD 2687 million (2006 prices), or 2.6% of total bilateral aid.

[14] See e.g. UNFCCC submissions by Papua New Guinea and the Coalition of Rainforest Nations, Norway, and the Meridian Institute Report www.redd-oar.org.

circumstances and the purpose for which the financing would be used. More specifically, 3 phases are proposed: (i) Voluntary funding for capacity building; (ii) a binding finance instrument for policies and measures; and (iii) markets for emission reductions.[15] The biodiversity-related implications for the different phases of fund vs. market approaches to financing are similar to those discussed above.

2.2.3 Baselines/reference levels: National vs. sub-national (including project-level) approaches

REDD baselines are essential as they provide a reference against which emissions performance can be assessed. REDD baselines /reference levels could be established either at the national accounting level and/or at the sub-national (including project-) accounting level.[16] From an environmental perspective, the baseline accounting level has implications for carbon leakage, as well as for biodiversity leakage. Carbon leakage refers to the displacement in anthropogenic emissions by GHG sources which occur outside the accounting boundary, *i.e.* if deforestation and/or forest degradation (and thus emissions) increase elsewhere as a result.[17] Both intranational and international leakage under REDD can therefore have adverse consequences for carbon as well as for biodiversity. Leakage can be detrimental in the case of biodiversity if deforestation/degradation is displaced from an area with low biodiversity value to another forest area with higher biodiversity value. In general, national level accounting of emissions is better able to account for intranational carbon leakage than sub-national and/or project level accounting (Angelsen *et al.* 2008) and is also better-suited to provide incentives for national-level strategies and implementation of policies and measures necessary to achieve and sustain emission reductions from the forestry sector (Karousakis and Corfee-Morlot, 2007).[18] However, if REDD is successful, it should free up financial resources in biodiversity conservation (*i.e.* from high carbon/high biodiversity areas). These conservation resources could then be redirected to target forest areas with low carbon/high biodiversity values (see *e.g.* Miles and Kapos, 2008).

The choice of the baseline design also has implications on who may be able to integrate biodiversity considerations into REDD activities. If REDD baselines/reference levels are determined at the national level, then the host country could decide where REDD activities could be prioritised, and could thus establish guidelines or methodologies that aimed to promote biodiversity co-benefits within a REDD system.[19] If instead REDD baselines/reference levels are established at the project level, then investors (or perhaps fund managers if it is a fund-based mechanism) would decide which REDD projects to invest in.

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[15] Note that even in Phase 3 one could have a mechanism that generates funding through the market but is not necessarily fungible with carbon markets.

[16] There are different views regarding what data/ methodology the REDD baselines/reference levels could be based upon. These include the use of historic data; historic with a development adjustment factor; or via projections (see e.g., GCP, 2009 for a summary). REDD credits/payments would not necessarily be generated for deviation below business-as-usual (BAU) projections: Several Parties (e.g. the EU, Papua New Guinea) have called for ambitious baselines (*i.e.* below BAU projections) taking into account respective capabilities of developing countries. This would, in effect, move beyond current offsetting practices, prevalent in the CDM, to *supplemental* global emission reductions.

[17] The extent of leakage depends on the elasticity of demand.

[18] Monitoring emission reductions from deforestation/degradation requires two types of data: changes in forest stocks and changes in carbon stocks.

[19] If a REDD mechanism is developed at the national scale, there is a risk of double counting for voluntary markets. To address this, a national registry, that would be needed for REDD implementation, might therefore also require that all voluntary credits are centrally registered.

2.2.4 Permanence

Permanence in the context of REDD refers to the possibility that emission reductions which are credited or paid for in one period, may subsequently be emitted at a later date due to natural or anthropogenic disturbances. There are a number of ways however in which the permanence issue can be addressed in REDD policy design. The establishment of credit reserves or insurance mechanisms are two examples.

There is a further permanence issue more closely related to biodiversity, via the links between biodiversity to facilitate climate change mitigation and adaptation. More specifically, Thompson *et al.* (2009) state "The permanence of efforts under UNFCCC negotiations, such as reducing emissions from deforestation and forest degradation (REDD), and of other forest-based climate change mitigation and adaptation policies and measures, is linked to the resilience of forests, and thus to forest biodiversity. REDD activities therefore should take biodiversity conservation into consideration, as this will help maintain forest ecosystem resilience and the long-term stability of the carbon pool."

2.2.5 Gross vs. net deforestation

A further issue that remains to be negotiated is whether gross or net deforestation rates will be considered when estimating emission reductions. Net deforestation (net loss of forest area) is defined in the FAO Global Forest Resources Assessment (2005) as overall deforestation minus changes in forest area due to forest planting, landscape restoration and natural expansion of forests. From a climate perspective, the most relevant carbon figure is what the atmosphere experiences (which is rationale for using net-values). The use of net rates however could hide the loss of mature (*i.e.* primary and modified natural) forests and their replacement *in situ* or elsewhere with areas of new forest. This could be accompanied by significant losses in biodiversity (see CBD 2009).

2.2.6 Local communities and indigenous peoples

The need and possible approaches to appropriately account for any potential risks of REDD on local communities and indigenous peoples are also being discussed (see Pesket *et al.* 2008). Potential adverse impacts stem primarily from the lack of clearly defined and well-established and enforced property rights in some potential REDD-host countries. Indigenous peoples play an important role in biodiversity conservation and sustainable use (Sobrevila, 2008). Inadequate safeguards to protect their rights might therefore have indirect adverse impacts for biodiversity.

3. Promoting Biodiversity Co-benefits in REDD: Targeting Multiple Ecosystem Services

In addition to the internationally-agreed design characteristics of a REDD financial mechanism, there are specific ways that biodiversity co-benefits of REDD can be promoted and/or maximised in REDD implementation. The notion of promoting or maximising biodiversity co-benefits under a REDD financial mechanism (whose ultimate aim is to mitigate climate change) is essentially that of targeting multiple ecosystem services. To achieve cost-effective outcomes, which in turn enable greater environmental benefits to be achieved, targeting multiple ecosystem services requires spatially explicit cost-benefit analysis. This involves the following:

- Identifying areas with high ecosystem services benefits (in this case carbon and biodiversity)
- Identifying areas of high risk of deforestation and degradation
- Evaluating opportunity costs

Once these have been addressed, it is necessary to develop the appropriate policies and incentives to capture and market the benefits.

3.1 Identifying areas with high ecosystem services benefits

Identifying areas with high carbon benefits, as well as those with high biodiversity benefits, requires tools to assess where these occur geographically and where they are spatially correlated. By economically evaluating and mapping where areas with high carbon benefits overlap with high biodiversity benefits, government and/or private-sector investors can potentially capture two environmental services for the price of one.

To ensure national ownership of any list of identified areas, this also requires a stakeholder and expert process, driven by the sovereign government. A blueprint for this exercise, as well as first results that can be used for the purpose of identifying priority REDD areas, are available through the national gap analyses under the CBD Programme of Work on Protected Areas.[20] The national gap analyses, carried out by Parties to the CBD, could be a useful tool for identifying areas for the location of REDD activities, in particular regarding the identification of priority forest areas for REDD activities at national level (CBD, 2009).[21]

Several efforts have been initiated at international level to establish and improve such tools/maps. One example is the Carbon and Biodiversity Demonstration Atlas, produced by UNEP's World Conservation Monitoring Centre (WCMC) (Kapos *et al.* 2008). The Atlas includes regional maps as well as national maps for six tropical countries showing where areas of high carbon storage coincide with areas of biodiversity importance. Figure 1 illustrates the national map for Panama, where it is estimated that 20% of carbon is stored in high carbon, high biodiversity areas. The maps also show where existing protected areas are high in both carbon and biodiversity.

As mentioned above, carbon is measured in units of tCO_2e. In contrast, Figure 1 suggests the variety of possible approaches to identify areas of high biodiversity. UNEP-WCMC has used 6 indicators for biodiversity, namely Conservation International's Hotspots, WWF 200 Ecoregions, Birdlife International Endemic Bird Areas, Amphibian Diversity Areas, Centers of Plant Diversity, and the Alliance for Zero Extinction Sites. Areas of "high biodiversity", as classified by UNEP-WCMC, are areas where at least four of the global priorities overlap, with areas in dark green indicating a greater degree of overlap.[22]

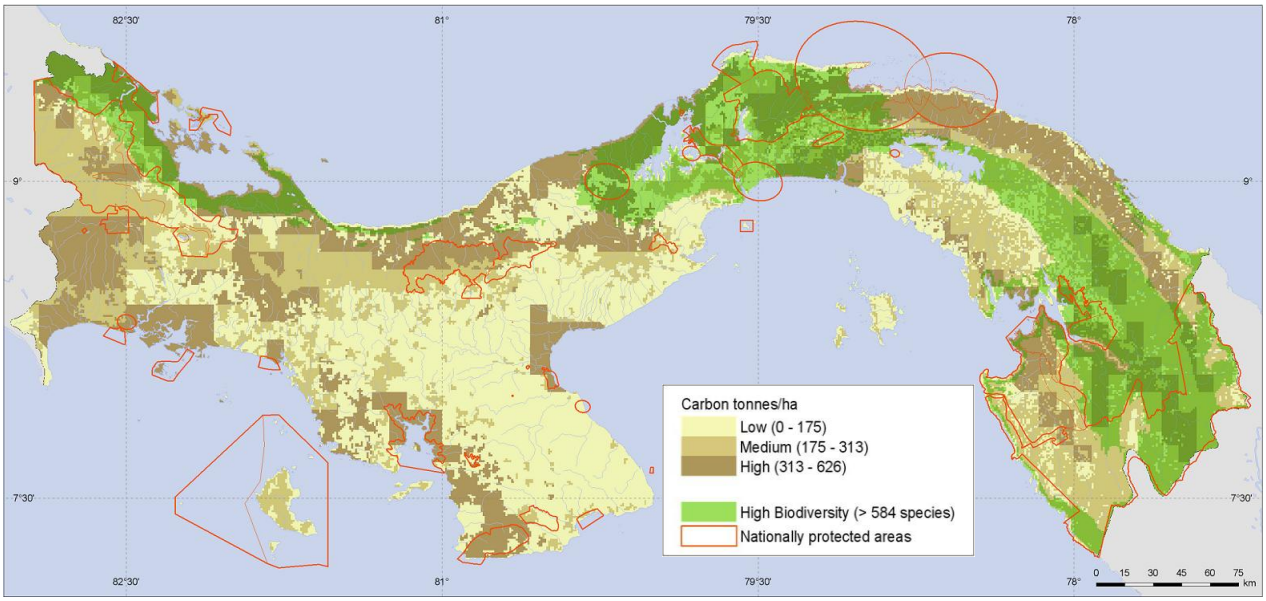
These types of maps represent areas of biodiversity priorities as defined by different groups. They do not necessarily identify areas with high biodiversity benefits in economic terms. Ideally, spatial maps on biodiversity benefits would incorporate the total economic value of these sites, with an assessment of both direct and indirect use values. Benefits transfer methods, which involve taking economic values from one context and applying them to another, could potentially be used to help establish these values, where site-specific analyses do not exist, but it is still likely to be a data and time-intensive exercise.

[20] www.cbd.int/doc/programmes/cro-cut/pa/pa-redd-2008-12-01-en.pdf

[21] The World Bank Forest Carbon Partnership Facility (FCPF) and the UN-REDD programme are also working to identify ways to enhance biodiversity co-benefits in REDD in the ongoing REDD demonstration activities. See Annex I for information on the FCPF.

[22] These national-scale maps draw, where possible, on finer scale nationally developed biodiversity datasets. The WCMC maps are intended solely as demonstrations of how combining spatial data can help to identify areas where carbon and biodiversity benefits coincide.

Figure 1. Example of a UNEP WCMC National Map: Panama



Source: Kapos *et al.* 2008.

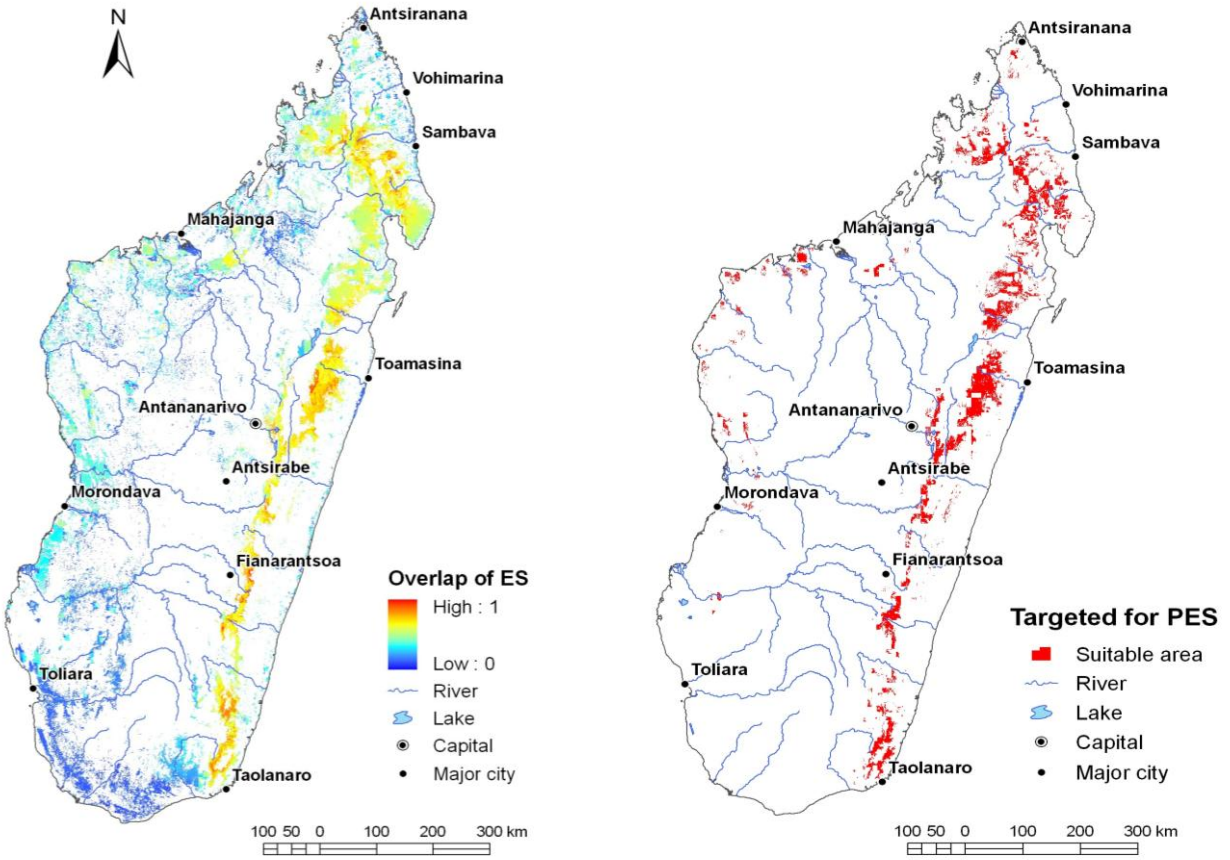
Efforts to estimate the economic values of biodiversity at spatial scale are already underway in certain locations (*e.g.* Wuensher *et al*. 2008; Wendland *et al*. 2009), including those by Conservation International (CI) and other NGOs. For example, Wendland *et al*. (2009) estimated the probability of deforestation in Madagascar and created an opportunity cost layer based on land used for agricultural production and land used for subsistence crops. A ranking system was then devised for high vs. low opportunity cost areas. The left panel of Figure 2 depicts the overlap between multiple ecosystem services in forest and wetlands; the right panel indicates where payments would be suitable, after taking account of additionality (*i.e.* that payments result in the provision of ecosystem services, additional to what would have occurred anyway) and opportunity cost issues.[23]

According to UNEP-WCMC (2008), "REDD-related decision-making at the national scale will need to be based, if at all possible, on nationally developed data for both carbon stocks and biodiversity". The IPCC has already established Good Practice Guidance for Land Use, Land Use Change and Forestry and methodologies for GHG emissions.[24] A technical expert group could be established to develop best-practice methods or guidance for how nationally-developed data for biodiversity could be collected to maximise synergies with REDD data collection and REDD implementation. Any such expert group should include representatives of forest-dwelling indigenous peoples and local communities in order to integrate traditional knowledge related to biodiversity within mapping processes.

[23] See www.oecd.org/env/biodiversity for all presentations from the OECD workshop on Incentives to Capture Biodiversity and Carbon Benefits for Reducing Deforestation (March 26, 2008), and other information.

[24] IPCC GPG-LULUCF provides supplementary methods and good practice guidance for estimating, measuring, monitoring and reporting on carbon stock changes and GHG emissions from LULUCF activities. This consists of a three tiered approach.

Figure 2. Targeted Payments for Ecosystem Services in Madagascar



Source: Adapted from Wendland *et al.* 2009.

3.2 Identifying high risks of deforestation and degradation

To ensure that financial incentives are indeed effectively reducing deforestation and forest degradation, payments must be targeted to forest areas that are at risk of conversion to alternative land-uses. Payments would otherwise be made to areas that would have been conserved anyway, implying that limited financial resources would be squandered. This is the additionality issue, a key issue under the REDD climate negotiations, and is intricately linked to baselines / reference levels (as discussed in section 2.1.3). This issue is therefore not specific to promoting biodiversity co-benefits in REDD and is not addressed here.

Identifying areas with high risks of deforestation and forest degradation should not necessarily result in the exclusion from eligibility of protected areas. Many protected areas suffer from poor management or a lack of adequate resources including for enforcement, which make them unable to adequately protect forest species and ecosystems. However, provisions for protected areas need to be designed with care as there are possibilities for perverse incentives on both accounts: some developing countries may have incentives to degazette their protected areas in anticipation of REDD payments. If protected areas are included however, it will be important to ensure that REDD payments are indeed additional. Including protected areas *de facto* may provide incentives for governments to claim they cannot sufficiently fund protected areas (and even reduce national funding to protected areas) so as to obtain international financing via a REDD mechanism. This may also raise fairness issues with other developing countries that have

made the needed investments for effectively protecting areas. The inclusion, or not, of protected areas as eligible in a potential REDD mechanism will clearly be a difficult issue to resolve and, if they are included, measures will be needed to avoid these perverse effects.

3.3 Evaluating opportunity costs

Evaluating opportunity costs of alternative land uses is needed to ensure that the limited financial resources are allocated in the most cost-effective manner. This issue is not specific to biodiversity and will be addressed via REDD. In general (albeit simplistically), if a market-based approach is used for REDD, the market will drive REDD activities to least-cost activities. If a fund-based approach is used for REDD, methods will be needed to ensure that funds are disbursed in a cost-effective manner (there is an increasingly large literature for example on improving the cost-effectiveness of Payments for Ecosystem Services).[25]

With respect to developing the appropriate policies and incentives to capture and market the benefits, section 2 outlined how REDD could be designed to enhance and maximise biodiversity co-benefits. Section 4 examines how policies and incentives to complement any future REDD mechanism could be designed to go beyond the biodiversity *co*-benefits, to target and capture biodiversity benefits directly.

4. Beyond Biodiversity Co-benefits in REDD: Multiple Payments for Multiple Benefits

It is possible to capture more than the biodiversity *co-benefits* in REDD (*i.e.* which implies two for the price of one) by creating supplementary incentives to capture and market additional biodiversity benefits. This involves making multiple payments for the multiple benefits provided by forests. Such payments for biodiversity conservation can be mobilised via voluntary or regulatory approaches, and can be designed as either market- or fund-based instruments.

Voluntary markets enable companies and individuals to purchase "units" of ecosystem services on a purely voluntary basis[26]; regulatory markets are created and regulated by mandatory regional, national, and/or international regimes, whereby such units are used for compliance purposes. Similarly, voluntary or regulatory fund-based approaches for biodiversity conservation could also be used to supplement REDD finances so as to explicitly target areas with high biodiversity benefits. [27]

Voluntary Markets that Bundle Carbon and Biodiversity Benefits

Similar to existing Gold Standard CDM credits[28], voluntary premiums for "Green Standard" REDD credits are also possible *i.e.*, voluntary premiums for REDD credits that provide additional biodiversity benefits. Indeed there are to date already several examples of initiatives that bundle carbon and biodiversity benefits for the voluntary carbon market. These include, *inter alia*, the Climate, Community

[25] See May 2008 Special Issue of Ecological Economics.

[26] Willingness-to-pay for this premium is motivated by *inter alia* the possibility to retain a competitive edge in an industry with environmentally-minded customers, or at the individual level, for intrinsic or altruistic reasons.

[27] These initiatives could be undertaken unilaterally, bilaterally or multilaterally at government, private sector or NGO level. For multilateral government level involvement, the domain for these decisions would be the UNCBD; not the UNFCCC.

[28] Gold Standard CDM credits in effect bundle GHG emission reductions (carbon benefits) with sustainable development benefits. For a CDM project to generate Gold Standard CDM credits, specific sustainable development criteria must be met, *i.e.*, above and beyond requirements under the UNFCCC. Gold Standard CDM credits are voluntary, and due to their higher "quality", entail a price premium in comparison with a UNFCCC accredited CDM credit. For more information see www.cdmgoldstandard.org/

and Biodiversity Alliance (CCBA), Plan Vivo, CarbonFix, Social Carbon, and the Californian Climate Action Registry (CCAR)[29] (see Box 1).

Box 1. Examples of Voluntary REDD-Bundling Initiatives

- The Climate, Community and Biodiversity Alliance – a partnership between research institutions, corporations and non-governmental organisations- has developed voluntary standards to help design and identify land management projects that simultaneously minimize climate change, support sustainable development and conserve biodiversity. The CCBA has 17 Standards criteria, 14 of which are required and 3 of which are optional. Three of the required criteria pertinent to biodiversity are: 1) Net positive biodiversity impacts; 2) Offsite biodiversity impacts; and 3) Biodiversity impact monitoring. Projects are audited by independent third party certifiers and each project is subject to a 21 day public comment period.
- CarbonFix has developed a standard to help ensure positive socio-economic and ecological benefits of climate forestation projects. They recently issued the first *green* carbon credits. CarbonFix requires that 30% of credits be retained in a buffer reserve and replanting to be undertaken 12 months after harvesting. Dual certifications under CarbonFix and the CCB Standard or Forests Stewardship Council are already possible.
- A Plan Vivo Certificate is an environmental service certificate representing the long-term sequestration of one tonne CO_2, plus additional ecosystem and livelihood benefits, including biodiversity conservation through expansion and strengthening of protected areas and native species.
- Social Carbon has designed a social carbon methodology (SCM) which examines 6 areas/objectives:
  - Biodiversity Resource The combination of species, ecosystems and genes that form the biological diversity present in any region. Relevant aspects of this component are the integrity of natural communities, the way people use and interact with biodiversity, the state of conservation, pressures and threats imposed on native species, and the existence of priority areas for conservation.
  - Natural Resource The stock of natural resources (*e.g.* soil, water, air, genetic resources) and environmental services (soil protection, maintenance of hydrological cycles, absorption of pollution, pest control, etc.) from which those resources derive.
  - Financial Resource The basic capital (money, credit/debt and other economic goods) available to people and organizations.
  - Human Resource The skill, knowledge and capacity for work that people possess, as well as good health.
  - Social Resources Work networks, social demands, social relations, relationships of trust, and association in social groups.
  - Carbon Resource The type of carbon project being developed.

Current Status in Selected Voluntary REDD-bundling Initiatives

	Number of projects
Climate, Community and Biodiversity Alliance	13 approved 25 undergoing validation
CarbonFix	1 certified 7 in the pipeline
Plan Vivo	3 operational 10 in application process

Source: Author, as of November 2009.

[29] For more information see: www.climate-standards.org; www.carbonfix.info; www.planvivo.org; www.socialcarbon.org

Prices of these voluntary REDD-bundling credits vary according to integrity of the standard applied but should be only be taken as indicative at this stage. Price differentiation will become clearer between the standards as the market matures.[30] According to the 2009 forest carbon offsetting survey, one of the three most important factors in the purchasing decisions of buyers of forestry credits is the potential for generating biodiversity benefits (which ranked equally important with the type of the project and the price). About a third of the respondents to the survey indicated that they would be willing-to-pay premiums of USD 4 and more per offsets that are also CCBA certified (Ecosecurities, 2009).

Though such voluntary biodiversity premiums in REDD can help to capture and market more than just the biodiversity *co*-benefits associated with REDD, it is important to note that voluntary schemes are unlikely to provide the scale necessary to create a global demand for biodiversity and change land prices fundamentally (Blom *et al.* 2008). Just as demand for carbon allowances, CDM CERs – and potentially REDD credits in the future – is driven by legally-binding GHG emission reduction commitments and regulated via an international carbon market, large scale international demand for biodiversity would come from large scale regulatory policies to ensure biodiversity conservation and sustainable use.

5. Concluding Remarks

Successful agreement on a future REDD mechanism at UNFCCC COP-15 and beyond would represent a substantial and unprecedented development in the creation of an international mechanism to help internalise the carbon-related ecosystem services from forests. By providing positive incentives to reduce emissions from deforestation and forest degradation in developing countries, a future REDD mechanism is likely to result in significantly promoting biodiversity co-benefits. If REDD includes conservation, sustainable forest management, and the enhancement of carbon stocks, even more so.

Some international REDD design elements however may pose risks to biodiversity, for example by providing perverse incentives to deforest in advance of a REDD mechanism coming in to force (*e.g.* so as to lower the baseline of forested area) or by encouraging the use of mono-plantations in afforestation/reforestation activities rather than the use of mixed native forest species. There is a need therefore for safeguards to avoid potential negative effects on biodiversity.

At the same time, overemphasis on non-climate change objectives and related biodiversity criteria in a REDD mechanism carries the risk of raising transaction costs associated with REDD, thereby resulting in less forest conservation and could therefore ultimately be counter-productive for biodiversity conservation and sustainable use. Though a REDD mechanism offers opportunities to realise both carbon and promote biodiversity co-benefits, the limitations of a REDD mechanism to act as a panacea for biodiversity loss need to be recognised. This report has examined ways in which biodiversity co-benefits in REDD can be promoted at the design and implementation phase, and how supplementary incentives to capture and market additional biodiversity benefits can be created and bundled together with a REDD mechanism.

Specific suggestions for biodiversity policy-makers include the following:

- Some international financing would be well-invested in economically evaluating and geographically mapping biodiversity and ecosystem services benefits as this can provide an important input to national REDD planning and implementation. An improved information base on national biodiversity will increase the likelihood of achieving and maximising biodiversity co-benefits in REDD.

[30] www.carbonpositive.net.

- For OECD countries, biodiversity-targeted international funding should be flexible and seek to avoid double payments. Rather, biodiversity-targeted funding should aim to complement REDD financing *e.g.* focussing in areas with high biodiversity and low carbon benefits.

- The on-going REDD demonstration activities provide an invaluable opportunity for biodiversity policy-makers to promote and financially support biodiversity monitoring, reporting and verification in REDD demonstration activities to enable biodiversity performance assessment over time. This will enable the analysis, comparison, and evaluation of different approaches and methods used to promote biodiversity co-benefits in REDD. Lessons learned during the implementation of these REDD demonstration activities can ultimately feed into the international and national level policy-making processes.

- Finally, biodiversity policy-makers may wish to consider the creation of a technical expert group on Promoting REDD Biodiversity Co-benefits to establish best-practice guidelines and principles, including on indicators for biodiversity. Such a group could in effect develop a "how-to" tool-kit for developing countries that are implementing REDD activities at the national, regional and/or local level.

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ANNEX 1:

REDD DEMONSTRATION ACTIVITIES, THE FCPF AND BIODIVERSITY

"As of March 13, 2009, 37 countries from Asia, Latin and Central America, and Africa have been selected as REDD Country Participants in the FCPF Readiness Mechanism, based on Readiness Plan Idea Notes reviewed by the Participants Committee and independent reviews by a Technical Advisory Panel. Many of these REDD Country Participants will receive grant support to develop a Readiness Plan, which contains a detailed assessment of the drivers of deforestation and degradation, terms of reference for defining their emissions reference level based on past emission rates and future emissions estimates, establishing a monitoring, reporting and verification system for REDD, and adopting or complementing their national REDD strategy."

"So far about US$107 million has been contributed by 11 Donor Country Participants in the Readiness Fund, with the target being to raise US$185 million to support the REDD Readiness efforts of the 37 countries selected into the FCPF. The target for the Carbon Fund is US$200 million, of which about US$51 million has been pledged already."

Source: http://www.forestcarbonpartnership.org/fcp/node/12

The REDD Readiness Preparation Proposal (R-PP) template (v.3 09-04-09) includes guidance relevant to biodiversity, namely:

Under Section 2b on REDD Strategy Options, para 3(iii) calls for "Sustainability and integration with other sector policies and strategies:

Synergies (or conflicts) between the identified options and other national development priorities, including assessment of trade-offs across development goals or sectors (*e.g.*, enhanced carbon stocks or land management capacity, but reduced local rural incomes or biodiversity in surrounding lands)"

Under Section 2d on Social and Environmental Impacts, the R-PP template states: "The assessments should give special consideration to livelihoods, rights (including those of Indigenous Peoples), biodiversity, cultural heritage, gender, the special protection of vulnerable groups in society, capacity development, governance, etc."

In addition, under Component 4: Design a Monitoring System, the template states: "In addition, a monitoring system also builds accountability and trust among local constituencies. The system design should include early ideas on including capability (either within an integrated system, or in coordinated activities) to monitor rural livelihoods, conservation of biodiversity, key governance factors directly pertinent to REDD implementation in the country, and to assess the impacts of the REDD strategy in the forest sector. Section 4b should be targeted to design a system for monitoring these variables"...

For further information see http://www.forestcarbonpartnership.org/fcp/

GLOSSARY

AAU	Assigned Amount Unit
A/R	Afforestation/Reforestation
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
ERU	Emission Reduction Unit
EUA	European Union Allowance
EU ETS	European Union Emissions Trading Scheme
FCPF	Forest Carbon Partnership Facility (World Bank)
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
LULUCF	Land Use, Land Use Change and Forestry
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
QELRO	Quantified Emission Limitation and Reduction Objective
REDD	Reducing Emissions from Deforestation and Forest Degradation
UNFCCC	United Nations Framework Convention on Climate Change
WCMC	World Conservation Monitoring Centre (UNEP)

Green Development Initiative (GDI)

Green Development Initiative

Update on the Green Development Initiative

Prepared by Earthmind in response to notification SCBD/ITS/YX/75558 regarding submission of information concerning innovative financial mechanisms, pursuant to CBD COP decision X/3, A, paragraph 8(c)

July 2011

In 2008, the Parties to the Convention on Biological Diversity (CBD) agreed to "improve actions… for enhancing the engagement of the business community" and to "come forward with new and innovative financing mechanisms." In 2010, the Parties agreed that "by 2020, at the latest, the mobilization of financial resources… should increase substantially."

In response, the Green Development Initiative (GDI) intends to establish a biodiversity standard and certification scheme for land management, not land ownership transfer. Through independent third-party certification, land managers can be recognised for their efforts to conserve biodiversity and to use biological resources sustainably and equitably. In so doing, the GDI aims to facilitate private financing for biodiversity.

The GDI biodiversity standard will apply CBD objectives, approaches and guidance to land management. Where appropriate, the approaches and guidance of biodiversity-related conventions and voluntary environmental and social certification schemes will also be referenced. In particular, the GDI standard will build on the CBD Ecosystem Approach. A prototype reference guide for a biodiversity certification system for land management is currently being drafted.

Regarding the potential demand for GDI certification and associated financial support for biodiversity management, research is also underway on the drivers and modalities for engaging businesses, investors and consumers. Private companies may seek certification for the biodiversity-responsible management of their own lands or as a tool for channelling support to the management of other areas.

To further understand the potential supply of GDI certified areas and the potential funding of these areas, a pilot programme is under way. This programme is exploring how a GDI standard could be applied to the management of a range of landscapes such as soy farms in Brazil and India, protected areas in Africa and Europe, cocoa plantations in Ghana, agro-forestry in Mozambique, and community-based natural resource management in Namibia.

Next steps include an international expert and stakeholder meeting planned for mid-October 2011 in Nairobi, Kenya, and securing additional financing to continue the programme of work. This work is focusing on piloting the design, implementation and financing of GDI-certified land management plans. If successful, a first formal phase of the GDI will be launched in 2012, either at CBD COP11, Rio+20, or IUCN WCC5.

Current support for the GDI comes from the inter-ministerial Biodiversity Policy Programme of the Government of the Netherlands. Earthmind serves as its secretariat. More information is available on the GDI website or by emailing Earthmind.

gdi.earthmind.net **gdi@earthmind.net**

International Union for Conservation of Nature (IUCN)

The International Union for Conservation of Nature (IUCN) welcomes the opportunity to provide information concerning innovative financial mechanisms (IFMs), pursuant to decision X/3, A, §8(c). IUCN strongly encourages the Parties to the CBD to support the further development of IFMs as a means of meeting the Strategic Plan for Biodiversity 2011-2020 and also expresses its interest in supporting ongoing efforts to ensure that IFMs realize their potential, including through further analysis and on-the-ground testing.

Towards a Green Economy

During the International Year of Biodiversity (2010), major achievements were made in raising the profile of conservation, demonstrate the increasing costs of biodiversity loss, and better understand the economic value of biodiversity and ecosystem services, notably through the release of the global study on The Economics of Ecosystems and Biodiversity (TEEB). However, further effort is clearly needed to make conservation more economically relevant and attractive in particular in the current situation in which the prospects for mobilizing additional resources for biodiversity remain elusive. IUCN believes that IFMs are central to effectively address this critical challenge of mainstreaming biodiversity and ecosystem values into society and the economy.

Innovative financial mechanisms are based on the notion that economic incentives can be used to achieve positive conservation outcomes. As highlighted in the reports of the expert workshop[1], IFMs can take on a variety of forms, involving both the private sector (e.g. markets for green products) as well as governments (e.g. environmental fiscal reform). Overall, their aim is to influence behavior across a range of economic sectors in order to align different interests with those of biodiversity conservation. IFMs can thus be seen as the means by which the transition to a Green Economy can be enabled.

This transition has already started. Today, governments are increasingly using incentives to encourage 'green' business, e.g. through their public procurement policies or economic stimulus packages (TEEB, 2010). Producers themselves are becoming more aware of the environmental impacts of their activities and some companies are actively seeking competitive advantage by going beyond the minimum required by law and aiming for a net positive impact on biodiversity. In many countries, consumers increasingly prefer biodiversity-friendly products and services. For instance, the sale of certified 'sustainable' forest products quadrupled between 2005 and 2007 (TEEB, 2010), while markets for certified fish, organic food and other 'nature-friendly' goods and services are growing faster than their conventional counterparts. Markets for ecosystem services (e.g. watershed protection, carbon storage and sequestration) are also expected to grow rapidly in the coming years (Ecosystem Marketplace, 2009)[2]. These developments are also leading more investors to seek out 'green' assets and opportunities (UNEP Finance Initiative, 2010)[3].

The main rationale for supporting the development of IFMs is to support a Green Economy transition by mobilizing a wider range of stakeholders and interest groups to join in the global

[1] http://www.cbd.int/financial/doc/2011-03-budapest-IFM-report-en.pdf
[2] http://ecosystemmarketplace.com/documents/acrobat/ECM%20Beyond%20Carbon_eng.pdf
[3] http://www.unepfi.org/fileadmin/documents/CEO_DemystifyingMateriality.pdf

effort to conserve the world's biodiversity. In light of the CBD's ambitious and far-reaching Strategic Plan for Biodiversity 2011-2020, it is apparent that strong engagement from all sectors of economic activity is essential. It is in this spirit of mobilizing a broader range of 'biodiversity beneficiaries' that IFMs need to be developed and applied.

Balancing Efficiency and Equity

It should be clearly emphasized that the quest to broaden and diversify the funding sources for biodiversity conservation should not mean that conservationists 'sell out on nature'. Also, the use of IFMs should not result in any type of 'commodification' of nature. Although markets can be used to encourage more sustainable behaviors by setting prices, they will never be able to capture the full value of nature. A payment for an ecosystem service, for instance, is aimed at influencing the behavior of a land owner or land steward, and is not intended to capture the value of an ecosystem. In fact, transactions for such schemes (e.g. payments for forest-based carbon projects) are often based on the opportunity costs of the foregone activity (e.g. agriculture or forestry) rather than on any estimation of the economic value of a given ecosystem or ecosystem service.

IUCN believes that there are many positive experiences with IFMs that can be used as a basis for further developing the concept at the international level. Through IUCN's collaboration with the private sector, it has become clear that business and conservation interests can go hand-in-hand (TEEB, 2010)[4]. Nevertheless, IUCN's experience has also demonstrated that the implementation of incentive-based mechanisms can often imply a trade-off between the efficiency and equity of outcomes. This trade-off needs to be carefully addressed and balanced. IFMs need to be supported and accompanied by accountable and equitable governance arrangements. Local-level ownership and participation are key conditions for the success of incentive-based conservation schemes. The Living Water Partnership Fund[5], which IUCN helped to establish in North-western Guatemala, provides a promising example of how positive social, economic and environmental outcomes can be reached through the development of an innovative and locally-owned financing scheme for supporting watershed conservation.

In light of the significant funding gap for conservation and the poor economic health of many donor countries, IUCN strongly urges Parties to give greater political support to IFMs. While there still is a need to further analyze, refine and test different IFMs, notably to ensure that the trade-offs between economic efficiency and social equity are well understood and dealt with, it is essential to move beyond the unsustainable 'business-as-usual' scenario of conservation finance. The objectives of the CBD can simply not be met unless Parties can agree to go beyond traditional sources of financing and adopt a broader and more inclusive approach to resource mobilization.

Gland, 29 July, 2011

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[4] For more information and relevant examples, see TEEB for Business (2010): http://www.teebweb.org/ForBusiness/tabid/1021/Default.aspx

[5] http://www.confluenciasagua.net/node/190

UNCCD/Global Mechanism

THE GLOBAL MECHANISM

UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION

APPROACH PAPER 2010-2011

Innovative Financing Sources and Financing Mechanisms:

New Opportunities for Sustainable Land Management and UNCCD

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Acronyms

CBOs	Community Based Organisations
CSOs	Civil Society Organisations
GM	Global Mechanism
IFS	Integrated Financing Strategy
IIF	Integrated Investment Frameworks
NGOs	Non Governmental Organisations
PES	Payment for Environmental Services
SLM	Sustainable Land Management
UNCCD	United Nations Conventions to Combat Desertification

1. Rationale

The Ten Year Strategic Plan and Framework to Enhance Implementation of the UNCCD (2008-2018) was adopted in 2007 by the Conference of the Parties of the Convention. It outlines priorities, including the need to "increase the level and diversity of available funding for combating desertification/ land degradation and mitigating the effects of drought."[1]. Outcome 4 of Operational objective 5 of the Ten Year Strategy specifically indicates that innovative sources of finance and financing mechanisms should be identified.[2]

With regards to financing sources, the Ten Year Strategy specifies that finance from new and untapped flows in the UNCCD context includes resources from a range of development actors and institutions, including private and public land users and organisations. In addition, tapping into financing flows and windows that are closely linked to land use is considered innovative finance as per the Strategy.

In terms of innovative mechanisms, economic and financial mechanisms that rely on regulation and markets to provide incentives for environmental stewardship are also relevant. These mechanisms include different types of regulations and direct or indirect payments schemes, for example tradable development rights, trading of emission reduction and payment for environmental services. Investment based mechanisms, like microfinance, are other types of mechanism that can provide financing for UNCCD and SLM practises.

Undoubtedly, official development aid and resources from affected country budgets are still the largest and most important sources of finance for land management. However, the call reflects the recognition that these are not sufficient to finance a full scale implementation of the UNCCD at the various levels. In addition, innovative finance, as outlined in the Ten Year Strategy, reflects the need to address the inter-sectoral nature of desertification and land degradation, and the often strong role of the private sector in land management.

While providing new opportunities, it is important to recognise that innovative financing is not a panacea for addressing the financial challenges of the UNCCD. Innovative resources often come in small pieces with high transaction costs, and co-financing may be needed. Innovative finance should therefore be regarded as complementary to more traditional sources of funding.

2. Definition of innovative finance

As per the Ten Year Strategic Plan Operational Objective 5.4, innovative financing sources and mechanisms for UNCCD implementation and SLM include "the private sector, market-based mechanisms, trade organizations, foundations, CSOs, and other financing mechanisms, for climate change adaptation and mitigation, biodiversity, conservation and sustainable use, and the fight against hunger and poverty."

[1] Indicator S-8 under Strategic objective 4: To mobilize resources to support implementation of the Convention through building effective partnerships between national and international actors

[2] Outcome 5.4 under Operational Objective 5: Financing and technology transfer.

Accordingly, the terminology 'innovative financing for the UNCCD and sustainable land management (SLM)' can be considered as an umbrella covering a range of sources, mechanisms and instruments, as well as related processes and thematic areas through which funding can be mobilised for UNCCD implementation and SLM. These includes i) actors and institutions, ii) investment based mechanisms, iii) incentive and market based mechanisms, and iv) thematic entry points for finance. Examples of mechanisms within these categories are illustrated in **Annex I**.

It is important to note that the different sub-groups of innovative financing sources and mechanisms are often linked. Private sector and CSOs are for example important partners and actors setting up market based mechanisms.

It is also understood that what is regarded "innovative" will vary from country to country. And more "innovative" or "new" opportunities for financing emerge from the ever changing international context. It is therefore important to be vigilant, monitor processes and seize opportunities when they arise.

3. Objective

As per the Ten Year Strategy, the Global Mechanism of the UNCCD (GM) has a "central responsibility" in identifying and exploring innovative sources of finance and financing mechanisms to combat desertification/land degradation and promote SLM.

The GM's objective is therefore **to identify, explore and promote financing instruments, mechanisms and sources which are most relevant and innovative in the UNCCD context**.

GM's approach is in line with its mandate and strategy to support affected countries, through financial services related to: (i) knowledge management, (ii) advisory and brokering services, and (iii) the development of partnerships and networks.

GM's work on innovative finance will inform and contribute to the Integrated Financing Strategy (IFS) processes at country-level. The IFS is a process for mobilising a mix of financial resources, including domestic, external and innovative sources of finance to fund SLM-related projects and programmes. During the process, governmental institutions, the private sector, CSOs and development cooperation agencies build coalitions, conduct a baseline assessment of investments, carry out diagnostic work to identify priorities and match resource demand and supply.

As called for by the Ten Year strategy, through the IFS the stakeholders work together towards developing an integrated investment framework (IIF) for SLM, a set of programme and project which respond to the national development strategy. Important components of the IFS and the IIF include the establishment of enabling conditions and the development of initiatives, project and programmes.

4. Services provided on innovative financing by the Global Mechanism

The Global Mechanism has in the past years built up expertise and experience on innovative financing sources and mechanisms relevant for UNCCD and has specific programmes and initiatives for a range of innovative sources and mechanisms. These include climate change financing, market access and trade, Civil Society Organisations, forestry, and more recently, market based mechanisms, decentralised cooperation, private sector, and philanthropic foundations (**Annex III** provides more detail of GM's existing programmes and initiatives on innovative financing).

The GM provides a range of services to partners at regional and national level for exploring financing sources and applying the mechanisms. The logical framework of GM approach to innovative financing is put forward in **Annex II.** It is aligned with Outcome 5.4 of the 10 Year strategy and reflected in GM's multi-year workplan 2010-2013 which was adopted by the Parties at COP9.

The two expected accomplishments for the GM are:

(i) Country parties are enabled to identify innovative resources and potential entry points for innovative sources of finance and financing mechanisms related to SLM (EA 5.4.01), and

(ii) Resources are mobilised for SLM through the application of innovative sources of finance and financing mechanisms (EA 5.4.02).

These accomplishments are reached through the following three categories of services provided by the GM:

1. **Knowledge management.** The GM generates analytical and methodological tools to identify innovative financing sources and mechanisms for SLM, and shares the knowledge, including through capacity development workshops.

2. **Advisory and brokering services.** The GM provides advisory services to countries on exploring and mobilising innovative financing mechanisms and sources under the integrated financing strategies (IFS) process. The GM also assists affected countries in mobilising additional resources and investments for SLM by brokering partnerships between stakeholders as part of the development and implementation of the integrated investment frameworks (IIF).

3. **Networking and partnership building.** The GM supports the establishment of an enabling environment for the mobilization of innovative resources by strengthening its network of international and regional institutions and facilitating partnerships.

4.1 Service 1: Knowledge management

Knowledge is generated and shared on innovative sources of finance and financing mechanisms.[3]

a) **Analytical and methodological tools developed to identify innovative financing mechanisms and sources.** This work includes developing conceptual frameworks for identifying and exploring innovative financing which are most appropriate for UNCCD implementation and SLM. It also includes analysis and developing tools and methodologies for identifying, tapping, and promoting the mechanisms and sources identified.

   Screenings and profiling of relevant innovative source of funding such as carbon funds, trade mechanisms, international NGOs, multinational companies and foundations are also part of this work. As is the elaboration of cost-benefit analyses and valuation techniques to develop arguments as to why stakeholders should invest in SLM.

b) **Knowledge on innovative financing is shared with stakeholders.** GM shares its knowledge on the range of sources and mechanisms with relevant stakeholders in a variety of ways, independently or in the context of developing integrated financing strategies (IFS) and integrated investment frameworks (IIF). Different methods are used, bilateral and multilateral consultations, as well as the organisation of specific capacity development sessions and workshops. Knowledge may also be shared through forums of international meetings, newsletters, and other media.

4.2 Service 2: Advisory and brokering services

Advisory and brokering services are provided to countries by GM for exploring innovative financing mechanisms under the IFS and the IIF[4]*and to promote investments in SLM.*[5]

a) **Feasibility studies and stakeholder analyses.** Studies and analytical assessments are undertaken in cooperation with national partners to identify the most appropriate innovative financing sources and mechanisms in the country context and how to access them. Through rapid or in-depth mapping exercises, potential stakeholders, technical and financing partners and investors operating in the country or region are identified, including CSOs (local and international), foundations and private sector companies, as well as appropriate financing mechanisms. These activities are undertaken in cooperation with national partners.

b) **Actors with the potential to invest in SLM/CCD are mobilised.** The GM plays the role of a broker in engaging and mobilising stakeholders through bilateral and multilateral dialogues, consultations and awareness raising. For example, stakeholders such as CSOs, foundations and private sector actors may be important partners; they may also be facilitators and investors when setting up a market based mechanism. Decentralised cooperation is another example where the GM can play the role as a facilitator and broker partnerships between local governments.

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[3] As per multi-year workplan 2010-2013 Outputs 5.4.01.01 and 5.4.01.02
[4] As per multi-year workplan 2010-2013, Output 5.4.02.01 and 5.4.02.02
[5] As per multi-year workplan 2010-2013 Output 5.4.02.02

c) **Programmes and projects developed in the context of the IIF.** The next step is to mobilise actors and partners to provide investments, donations, or in-kind contribution in order to develop and implement relevant projects and programmes. These initiatives are as result of the IFS process and part of the IIFs.

4.3 Service 3: Networking and partnerships

Networks are developed and partnerships are established with international and regional institutions to facilitate mobilisation of innovative resources.

a) **GM network strengthened.** GM monitors and participates in UNCCD and other SLM relevant international and regional policy dialogues and initiatives, with a view to promote relevant issues, explore funding opportunities, and identify and build relationships with potential partner organisations and networks.

b) **Partnerships developed**. Strategic partnerships may be established at international and regional level to explore jointly innovative finance opportunities and build expertise, undertake technical activities, or strategy- for example, to support innovative resource mobilisation at national level.

5. Monitoring and evaluation

The performance indicators for Outcome 5.4 of the 10 year strategic plan are:

1. Level of satisfaction of country Parties with information provided to them by the GM[6] , and
2. Level of satisfaction of country Parties with experience gained with support of the GM[7].

The level of success will be measured by a survey of country Parties' satisfaction that will be carried out by the GM. In addition to this the innovative financing approach by the GM should be monitored and evaluated based on the output quantifiers of the RBM system for Outcome 5.4, as put forward in annex I. This will be done with the help of a tracking system assessing the resources mobilised as a result of the approach, compared to the resource the GM has invested in implementing the approach.

[6] Refers to expected accomplishment 5.4.01: Country parties are enabled to identify innovative resources and potential entry points for innovative sources of finance and financing mechanisms related to SLM.

[7] Refers to expected accomplishment 5.4.02: Resources are mobilised for SLM through the application of innovative sources of finance and financing mechanisms.

Annex I – Innovative financing sources and mechanisms for UNCCD/SLM

The following is an overview of what has been identified as promising innovative sources and mechanisms for UNCCD and SLM. The terminology "innovative financing for the UNCCD and SLM" can be regarded as an umbrella covering a range of sources, mechanisms and instruments as well as related processes and thematic areas.

The mechanisms and sources under the innovative umbrella have been clustered into four broad categories. The different groups are strongly interlinked; for example actors and institutions are being important partners and investor in the mechanisms and thematic areas.

1. **Actors** includes stakeholders that mobilise and channel resources and finance for SLM.
2. **Thematic entry points** for finance includes important processes and initiatives with high relevance for land use and is seen as an innovative approach to channel funding for SLM.
3. **Incentive and market based mechanisms** includes economic or financial mechanisms that provide economic incentives for SLM practices by transferring financial resources from those willing to pay for the sustainable generation of ecological goods and services, to those willing to provide these goods and services in turn.
4. **Investment based mechanisms** include instruments that are providing funding for UNCCD/SLM through credit or savings.

There is a wide range of actors and institutions that are not new and innovative as such, but which can be seen as innovative sources of finance, as well as technical and political partners, in the UNCCD context. Although of high importance, HIPC has not been included under innovative sources and mechanisms as it has become a regular instrument and is no longer seen as innovative finance.

The GM has established programmes and initiatives covering most of the sources and mechanisms presented, and is continuously identifying for new financing mechanism and sources.

Innovative financing sources and mechanisms			
1. Actors	**2. Thematic entry points**	**3. Incentive & market based mechanisms**	**4. Investment based mechanisms**
▪ CSOs ▪ Foundations ▪ Private Sector ▪ Emerging Donors ▪ Local Governments (decentralised cooperation)	▪ Climate Change ▪ Trade ▪ Rural development & poverty reduction ▪ Food security and agriculture ▪ Biodiversity conservation ▪ Water & Forest ▪ South South Cooperation ▪ Gender & women's empowerment	▪ Public Payments ▪ Payments under regulation ▪ Self organised private deals ▪ Certification & eco-labelling	▪ Micro finance ▪ Environmental funds ▪ Environmental performance bonds ▪ Green venture capital funds

Annex II - Logical Framework

GM EXPECTED ACCOMPLISHMENTS UNDER TEN YEAR STRATEGY OUTCOME 5.4[8]	GM'S SERVICES AND OUTPUTS[9]	OUTPUT QUANTIFIERS
EA. 5.4.01 Country parties are enabled to identify innovative resources and potential entry points for innovative sources of finance and financing mechanisms related to SLM. <u>Performance Indicator:</u> Sector-specific modules on innovative sources are developed and delivered in countries.	**Knowledge management:** **5.4.01.01**. Analytical and methodological tools developed to identify and tap innovative sources of finance, and identify and apply innovative financing mechanisms for SLM **5.4.01.02**. Capacity development workshops organized to identify and mobilize innovative sources of finance	# of tools developed # of workshops carried out
EA. 5.4.02 Resources are mobilised for SLM through the application of innovative sources of finance and financing mechanisms. <u>Performance Indicator:</u> Number of countries and subregions assisted by the GM in mobilizing innovative finance.	**Advisory and brokering services:** **5.4.02.02**. Advisory and brokering services provided by the GM to promote investment in SLM by the private sector, foundations and CSOs in integrated investment frameworks	# of countries and sub-regions supported
	Networking and partnerships: **5.4.02.03.** Partnerships developed with international and regional institutions to facilitate the mobilization of innovative sources of finance and financing mechanisms	# strategic partnerships established

[8] As per GM Multi-year workplan 2010-2013 adopted by the Parties at COP9
[9] As per GM 2010-2011 work programme

Annex III - Global Mechanism's programmes and initiatives on innovative finance

The GM has developed specific programmes and initiatives on a number of innovative sources and mechanisms for financing SLM. The following gives a short overview of the existing programmes and initiatives on which the GM is working to mobilise innovative financing, their justification and approach.

1. Civil Society Organisations and Foundations

Over the course of the last two decades, structural adjustment programmes in developing countries have led to a significant reduction in state support. As a result, Civil Society Organisations (CSOs)[10] have become important development actors in marginalised rural areas. They address land degradation issues and carry out programmes and campaigns supporting rural livelihoods, agriculture, forestry, water management, food security, climate change adaptation, and disaster risk mitigation.

CSOs and foundations mobilise significant resources from public and private sources for service delivery and advocacy.[11] They are financial actors but also political and technical partners. CSOs leverage resources through awareness raising and advocacy. They can also improve the quality of interventions on the basis of their experience and links to communities. The GM promotes and facilitates the participation of national and international CSOs in the IFS process, and is increasingly engaging with foundations. Accordingly, CSOs link their activities to a national response to SLM and UNCCD and position themselves to directly engage in the IIF through partnerships, projects and programmes.

2. Climate Change Finance

Climate change is one of the most important issues facing the international community, and one that demands an urgent global response. Since land degradation, deforestation, climate variability and poverty are interconnected, the various sources of funding available need to be combined, as far as possible into a financial "package" to increase their impact.

The GM's Climate Change Finance Programme supports the regional programmes in implementing integrated financing strategies (IFSs) at the request of country Parties. The programme is primarily concerned with accessing climate change financing mechanisms and integrating them into the GM's broader IFS process, with the ultimate objective of ensuring adequate, sustained investment flows into SLM to the benefit of rural populations living in fragile and/or degraded landscapes.

3. Forestry Finance

Forestry is a cross-cutting issue for the UNCCD. The convention acknowledges the direct impact deforestation and land degradation have on soil and water and their indirect impact on climate change/variability and declining biodiversity. However, traditionally forestry has not been seen as a key sector in implementing the UNCCD and does not adequately feature in countries' broader

[10] Including Non Governmental Organisations (NGOs), Community Based Organisations (CBOs), Farmers' and producers' organisations, and Foundations

[11] OECD-DAC estimates that Northern CSOs raised $20-25 billion of non-ODA funds in 2006, compared to $140 billion of ODA the same year. In addition, CSOs act as channels to 10% of ODA.

strategies for poverty reduction and development, especially in Sub-Saharan Africa, despite the strong correlation between sustainable forest management (SFM), sustainable land management (SLM) and poverty reduction. The GM's forest finance programme is, therefore, a source of innovative finance *per se* in the context of UNCCD implementation. It offers an entry point to harness synergies, tap opportunities and is an efficient approach for attaining the multiple objectives of the Rio Conventions and related processes.

In addition to resources that can be mobilised at the national level through mainstreaming national forestry plans (NFPs) into poverty reduction strategy papers (PRSPs) and payment for ecosystem services (PES), there are considerable resources that can be accessed from multilateral and bilateral sources. In particular, there are resources that can be accessed from the World Bank under its Forestry Strategy, the BioCarbon Fund, Climate Investment Funds, especially the Forest Investment Fund (FIP, and International Finance Corporation (IFC). The European Commission also has a programme on "Environment and Sustainable Management of Natural Resources" and the "Cotonou Agreement", which are sources of forest finance.

There are already considerable forest finance opportunities under the "Reduction of Emissions from Deforestation and Degradation" (REDD) mechanism under the United Nations Framework Concention on Climate Change (UNFCCC) currently under discussion is another source of forest finance that should benefit UNCCD implematation. This is in addition to forest finance available under the Kyoto Protocol. The Convention on Biological Diversity (CBD) Programme of Work includes "rehabilitation of degraded and deforested ecosystems" and this is yet another source of forest finance relevant to UNCCD. The Global Environment Facility (GEF) has a "Strategic Objective" on Sustainable Forest Management" (SFM) with "Strategic Programmes" beneficial to SLM.

4. Gender and women's empowerment

In rural areas, especially in developing countries, women are the main managers of essential household resources such as clean water, fuel for cooking and heating, and fodder for domestic animals. Not only do women depend on the surrounding environment for their livelihoods, but today they also account for more than half of the world's agricultural workforce. Their growing contribution to household income is therefore increasingly decisive for family survival. With their invaluable knowledge of natural resources, it is clear that women play an essential role in environmental management and in implementing the UNCCD. Women are proficient in managing natural resources when equipped with the right tools. However, lack of empowerment can make them extremely vulnerable to the effects of ecosystem degradation.

The GM has developed the Gender programme (GP) to enhance its impact at country level by strengthening the engagement of marginalized actors, particularly poor rural women, and by linking with sectors that have not traditionally been involved in UNCCD implementation, but that have significant potential for increasing investment flows for combating desertification and promoting sustainable land management (SLM). The GP is designed to increase the visibility of the links between environmental sustainability and gender equality, and to help integrate environmental policies into other sector policies such as education, water, and energy. Since gender is a cross-cutting issue, looking at SLM from a gender perspective creates links with other environmental issues, including climate change and biodiversity.

5. Market Access & Trade Finance

Trade has an undeniable impact on the environment and may contribute to land degradation in different ways. Natural resources are often regarded as 'free inputs' to production processes and this leads to their over-exploitation. The growth of trade and exports may also exacerbate environmental degradation by encouraging production techniques, such as mono-cropping, that put pressure on natural resources. Without adequate incentives and policies, environmental costs are not internalized into production systems, and industries do not adequately address the environmental degradation they cause.

The GM launched its Market Access & Trade (MAT) Programme in order to engage with trade processes in its efforts to promote investments in SLM. By making the linkages between trade processes and the way land is exploited and managed, it is possible to tap into trade-related sources of funding for SLM, such as ODA and budget support to trade. The programme is therefore engaged in the Aid for Trade process at the global and country level, and partners with trade organisations with a view to include trade resources and to activate trade financing mechanisms in the context of the IFS.

6. Incentive and marked based mechanisms

When land degrades, it sets off a series of impacts that go beyond its geographical location and the costs are borne by society in general. In order to avoid these costs, it is necessary for the society to provide incentives for land user to implementing measures to prevent land degradation. Market based mechanisms[12] can be used to facilitate such incentives and compensations and payments and have been recognised as promising incentive systems to encourage the restoration of degraded land[13].

The GM has, in cooperation with CATIE[14], identified the most promising market based mechanisms for SLM that rely on public payments, open trading under regulation, self organised private deals, and ecolabeling and certification schemes. [15] CATIE has also developed a methodology to evaluate the appropriateness of a market based mechanisms to prevent land degradation in a given context. On this basis, the GM identifies and mobilises potential stakeholders (buyers and providers of environmental services, as well as technical and financial facilitators) to explore and develop the mechanisms with the view to establish sustainable investment in sustainable land management practices.

7. Private Sector Financing

Land use and land management are to a large degree a private sector activity, taken up by a wide range of private sector actors from large corporations to small scale farmers. The private sector has the potential of playing an important role in combating desertification and land degradation, both as a potential source of funding and as a stakeholder investing directly in sustainable land management (SLM) practises and corporate responsibility schemes.

The private sector programme of the GM aims to engage more private sector stakeholders in the implementation of the Convention and to encourage more investments in SLM practices, by promoting the sector's participation and investments into e.g. climate change mitigation activities, environmentally sustainable trade processes, investment in market based mechanisms, public private partnerships and through corporate socially responsibility programmes. The programme will also look at the role of microfinance for the private sector.

8. South South Cooperation

South-to-south cooperation is widely recognized as an effective tool for mobilizing additional resources and rationalizing the use of existing financial, technical and organizational resources through enhanced consultation and new partnerships at sub-regional, regional and international levels. For example, the 2009 Doha Declaration on Financing for Development "encourages developing countries in a position to do so to continue to make concrete efforts to increase and make more effective their South-South cooperation initiatives in accordance with the principles of

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[12] There are different definitions of market based mechanisms. Verweij (2002) defines them as: "…an institutional arrangement that results in the transfer of financial resources from those willing to pay for the sustainable generation of ecological goods and/or services, to those willing to provide these goods and services in turn."

[13] UNCCD Ten Year Strategy 2008-2017, Outcome 5.4, and recommendation from UNCCD High-Level Policy Dialogue, Bonn 2008.

[14] Centro Agronómico Tropical de Investigación y Enseñanza (CATIE)

[15] Adapted from Scherr, S. J., White, A. and Khare, A. (2004), *For services rendered: the current status and future potential of markets for the ecosystem services provided by tropical forests,* ITTO Technical Series No 21,International Timber Trade Organization

aid effectiveness", and "acknowledge the role played by middle-income developing countries as providers and recipients of development cooperation".

The GM's South-to-south cooperation programme, SolArid, brings together the countries of the Sahel and the Sahara and aims to highlight the specific characteristics of these countries that must be taken into account by the international community when developing strategies to combat desertification and poverty. It also aims to establish a permanent network to exchange experiences on resource mobilization strategies, to develop financial partnering strategies and to foster partnerships.

9. Valuation of Land Resources and the Impacts of Land Degradation

Solid economic arguments are needed to mobilise financing, including innovative sources such as those originating from private sector investments, or for setting up market based mechanisms. In particular, there is a demand for a comprehensive methodological approach for assessing the value of land resources and the benefits of Sustainable Land Management (SLM) investments at national and global levels.

A programme to support the analysis of the economics of SLM to inform decision making at the national, regional and global level has been established as a partnership initiative between the GM and renowned research institutions, universities, and think tanks. The programme is expected to increase public and private investments in SLM through the generation of scientifically rigorous arguments that demonstrate the economic benefits of SLM as opposed to the costs of unsustainable business-as-usual practices. Particular attention will be paid to the poverty reduction potentials of SLM and the links between SLM and overall national development strategies and policies. In addition to catalyzing interest from a wide range of partner institutions who are willing to collaborate and share costs with the GM on developing and implementing the initiative, this initiative has the potential to attract voluntary contributions from traditional and non-traditional donors to finance GM operations.

The studies that will be undertaken under this initiative will generate concrete recommendations pinpointing opportunities for investments in the short, medium and long term, depending on the country context and the specificities of the study area. They will also identify the most appropriate financing instruments that may be used to materialize this investment potential.

Business and Biodiversity Offsets Program (BBOP)

DOCUMENT COVER SHEET

Please note that this document is a draft prepared on behalf of the BBOP Secretariat. It is a work in progress by the authors listed below and doesn't necessarily represent the views of the members of the BBOP Advisory Group.

Date updated:	5 October 2010
Title:	***Biodiversity offsets: policy options for government***
Authors:	Prepared by Michael Crowe and Kerry ten Kate
Abstract:	This paper draws on the experience of governments that have already developed and implemented biodiversity offsetting policies. It also takes into account the practical experience of businesses in putting offsets into place on a voluntary basis, including those undertaken in collaboration with BBOP as pilot projects. Its purpose is to serve as a very basic introduction to some key issues, which certainly deserve to be considered in more depth subsequently, and thus to contribute to the consideration of biodiversity offset policy options by governments and their advisors. The paper examines the principles underlying offsetting policy, identifies the various roles of government in offsetting schemes, looks at the connections to other policy areas and considers the significant implementation issues. Following this introduction, section 2 sets out the fundamentals of biodiversity offsets and biodiversity offset policy, including the principles for best practice biodiversity offsets, the different approaches available to governments when considering an offset scheme and the different policy options for biodiversity offsets. Various ways of implementing offset policies, including through markets and existing permitting or consent use systems tied to environmental impact assessment are discussed. Section 3 explores the possible roles for governments in developing and implementing policies on biodiversity offsetting. The roles include those of policy maker, regulator, market maker, broker and monitoring and compliance agency. Section 4 looks at the ways in which biodiversity offsetting policy can be integrated with other policy areas including environmental impact assessment, strategic environmental assessment, industry policy and whether offsets can be designed to offer multiple benefits (for instance, carbon and water). Section 5 covers capacity issues, reviewing the requisite skills and resources a government may require to establish a biodiversity offsetting scheme. This section also discusses cost recovery for situations where government services are provided. Finally Section 6 looks at experiences in a range of situations around the world where biodiversity offsetting has been attempted, in order to draw out the key lessons for success.

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Biodiversity Offsets: Policy options for governments
A draft for discussion
Michael Crowe and Kerry ten Kate

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Biodiversity Offsets: Policy Options for Government

Executive summary

Biodiversity offsets are designed to achieve no net loss (or a net gain) of biodiversity in the context of development projects. This goes beyond traditional mitigation, and encourages business to take responsibility for its impacts. Interest in this approach is growing as the potential of biodiversity offsets to help achieve wider goals of conservation; wise land-use planning and sustainable development are increasingly appreciated. Governments face the challenge of balancing economic development with a public interest in protecting biodiversity.

By contributing to regional conservation and land-use planning, biodiversity offsets can help the 193 government parties to the Convention on Biological Diversity who committed to 'achieve by 2010 a significant reduction of the current rate of biodiversity loss'.

The purpose of this paper is to contribute to the consideration of biodiversity offset policy options by governments and their advisors. The paper examines the principles underlying offsetting policy, identifies the various roles of government in offsetting schemes, looks at the connections to other policy areas and considers the significant implementation issues.

The paper is intended as a basic introduction to biodiversity offsets policy. We recognise that many of the issues presented are complex and will benefit from more in-depth and detailed discussion. The main aim of this initial draft is to identify policy options at a general level in the anticipation of subsequent papers based on further research and consultation.

BBOP's definition of offsets includes reference to 'no net loss of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity'.

There are broadly two kinds of biodiversity offsets:

(a) ***Voluntary biodiversity offsets***, which a developer undertakes in circumstances where there is no legal requirement to do so, because it perceives a business advantage (such as license to operate, reputational benefits, competitive advantage, market share, etc); or

(b) ***Regulatory biodiversity offsets***, which are required by law.

Governments can introduce biodiversity offsetting policy and regulation in two basic ways. The first is through specific provisions on biodiversity offsets (and perhaps other aspects of biodiversity conservation) and the second is to incorporate offsetting provisions into other laws and policies that deal with environment impact assessment (EIA), land use planning, strategic environmental assessment (SEA), sectoral policies or broader environmental policies.

The decision on which approach to take depends to some extent upon the legal customs of the jurisdiction concerned, and also upon the scope of the other laws relative to the intended scope for biodiversity offset requirements. For example, in a particular jurisdiction the EIA laws may only cover large projects or projects in particular industry sectors (for instance, construction and extractives, but not agriculture). If the intention is to introduce offsetting for a wider range of projects, it may be necessary to introduce a specific law requiring offsets for the desired scope.

The main policy options for government seeking to implement an offsets arrangement are focussed on the processes for specifying biodiversity offsets in relation to defined impacts. However, specifying an offset in terms such as size, type, quality and locality is only half of the task. The next challenge is for the developer to discharge the obligation to implement the offset. There are three main approaches to this task of implementing biodiversity offsets: developer-initiated, in lieu fees and market mechanisms.

Under *developer initiated offset implementation,* while policy may encourage or require offsets, the government generally takes a non-intervention stance on the manner of their implementation, and the onus rests with the developers to find their own offsets (whether voluntary or required by regulation).

Under *In lieu fees* a government agency stipulates a payment from the developer with the intention of deploying the funds at a later date to find a suitable offset.

Markets can also be used to supply biodiversity offsets for developers. Such markets do not usually develop spontaneously, but require government intervention to set up the key components. Properly designed and operated, markets can be very effective in supplying offsets in a timely and cost-effective manner.

The basic elements for an offset market are units of trade (credits), trading rules and credit registers.

Credits are units of gain that can be traded in an offset market. The key consideration for the utility of credits is that they meet all the requirements for gain as specified in the offset policy of the jurisdiction. Government can engender market confidence by establishing the property status of credits through legislation.

Biodiversity credit registers are another important component of an offset market. Registers serve two main functions:

- To be the authoritative record of the number, location, characteristics and ownership of biodiversity credits in the jurisdiction;
- To provide quality assurance for the registration (creation) of credits.

Governments can also assist the establishment of biodiversity offsets markets by facilitating the establishment of marketplaces. A marketplace for biodiversity credits will comprise brokers and traders.

The degree of segmentation and the level of demand in the market can interact to influence the types of offset supply mechanism that evolve in the market. These mechanisms include conservation banks, aggregated offsets, bespoke trades and 'over-the-counter' arrangements.

The different possible roles of government in relation to biodiversity offsets policy are described. These are:

- Policy-maker or regulator
- Provider, curator and source of authoritative biodiversity data
- Buyer of offsets
- Seller of offsets
- Broker
- Operator of register of credits, standard setting
- Provider of processes to ensure the permanence of offsets
- Monitor and enforcer
- Identifying and managing conflicts of interest between these roles (probity)
- Creating the market

The main sources of the cost of developing and implementing biodiversity offsets policy are identified. The costs associated with these various processes and services will vary from country to country and need to be

estimated on a case-by-case basis. However, experience in jurisdictions that have already established policies and offset schemes of varying design and complexity has demonstrated that these are not trivial tasks. It can be anticipated that it would take several years and the input of a variety of expertise to develop a policy and establish an operating scheme. While there are many costs to be considered, a government could recover these costs in part or in full. This is done by charging fees for the services provided to the users of the offset scheme.

Some of the lessons that have been learnt from the experience in various countries from designing and operating biodiversity offset policy and programmes are noted.

Finally the paper outlines suggested ways forward for governments interested in exploring biodiversity offset policy options. The recommended steps are:

- Fact-finding and gap analysis – policy
- Fact-finding and gap analysis – biodiversity data
- Fact-finding– cost-benefit analysis
- Pilot projects
- Integrating biodiversity offsets with land-use planning at the national or regional levels:
- Identify, analyse and evaluate policy options
- Policy formulation and system design
- Implementation of policy, monitor and review.

Biodiversity Offsets: Policy options for governments

Michael Crowe and Kerry ten Kate

1. Introduction

1.1 Context and outline

About biodiversity offsets

While new construction and infrastructure are essential for development, they are currently a significant cause of today's unprecedented loss of biodiversity, which is recognised as one of the most critical global issues facing humankind.[1] Biodiversity is lost as natural habitats are destroyed and fragmented for agriculture, fisheries, forestry, oil and gas, mining, transport, tourism and the construction of infrastructure all play their part in the loss. In the search for sustainable development, companies, financial institutions, governments and civil society are seeking innovative mechanisms to compensate for unavoidable losses to biodiversity and impacts on human well-being and to attract more investment in conservation.

Biodiversity offsets are designed to achieve no net loss (or a net gain) of biodiversity in the context of development projects. This goes beyond traditional mitigation, and encourages business to take responsibility for its impacts and to internalise environmental costs. Interest in this approach is growing as the potential of biodiversity offsets to help achieve wider goals of conservation; wise land-use planning and sustainable development are increasingly appreciated. Governments face the challenge of balancing economic development with a public interest in protecting biodiversity. By contributing to regional conservation and land-use planning, biodiversity offsets can help the 193 government parties to the Convention on Biological Diversity who committed to 'achieve by 2010 a significant reduction of the current rate of biodiversity loss'[2].

Interest in biodiversity offsets continues to grow. There are four main drivers for their broader uptake:

- More governments introducing or exploring policy on biodiversity offsets;

[1] The Global Biodiversity Outlook 3 (UNEP, 2010) finds that:

- Species which have been assessed for extinction risk are on average moving closer to extinction.
- Amphibians face the greatest risk and coral species are deteriorating most rapidly in status. Nearly a quarter of plant species are estimated to be threatened with extinction.
- The abundance of vertebrate species, based on assessed populations, fell by nearly a third on average between 1970 and 2006, and continues to fall globally, with especially severe declines in the tropics and among freshwater species.
- Natural habitats in most parts of the world continue to decline in extent and integrity, although there has been significant progress in slowing the rate of loss for tropical forests and mangroves, in some regions. Freshwater wetlands, sea ice habitats, salt marshes, coral reefs, sea grass beds and shellfish reefs are all showing serious declines.
- Extensive fragmentation and degradation of forests, rivers and other ecosystems have also led to loss of biodiversity and ecosystem services.
- Crop and livestock genetic diversity continues to decline in agricultural systems.
- The five principal pressures directly driving biodiversity loss (habitat change, overexploitation, pollution, invasive alien species and climate change) are either constant or increasing in intensity.
- The ecological footprint of humanity exceeds the biological capacity of the Earth by a wider margin than at the time the 2010 target was agreed.

[2] For information on the 2010 target, please see http://www.cbd.int/2010-target/. The Parties to the Convention on Biological Diversity accept that the 2010 target has not been met. UNEP/CBD/COP/10/8 provides a report on implementation of the Strategic Plan and progress towards the 2010 biodiversity target, drawing upon information from Parties' fourth national reports. UNEP/CBD/COP/10/9 by the CBD Executive Secretary offers an updated technical rationale for the proposed goals and targets of the Strategic Plan. See http://www.cbd.int/cop10/doc/

- More companies undertaking biodiversity offsets voluntarily for business reasons. (The business case for companies is described in Box 5 on page 18);
- More banks and investors requiring biodiversity offsets as a condition for access to credit or investment; and
- More NGOs and civil society groups encouraging developers to undertake biodiversity offsets.

A growing number of governments are introducing or planning law and policy related to biodiversity offsets. Many governments are committed to a target to achieve significant reductions of the current rate of biodiversity loss within their jurisdictions. Some have gone further and made policy commitments aimed at no net loss or a net gain of biodiversity. Biodiversity offsetting is a key policy measure that governments can adopt as part of the implementation of these policy targets.

Offsetting provides a way of pursuing a no net loss outcome for biodiversity for development projects and programs in the context of the 'mitigation hierarchy': ('avoid, minimise, restore, offset').

Biodiversity offsets can achieve more and better conservation outcomes than typically result from the planning of mitigation measures for development projects. They are also a tool for companies to manage biodiversity risk and opportunity, and for society to mainstream considerations of biodiversity into economic decision-making, through governments' planning processes, licenses and permits and financial institutions' lending and investment decisions. As biodiversity offsets involve working with land managers to address underlying causes of biodiversity loss, they offer indigenous peoples and local communities an opportunity to be involved in project planning, and to establish offset activities that contribute to sustainable livelihoods. Indigenous peoples and local communities sometimes object to development projects, feeling their permission and involvement in decisions were not sought, that they will not benefit fairly and that the project will have negative environmental impacts on their way of life. The process of designing and implementing a biodiversity offset should involve affected and interested people to ensure they benefit, which builds community support for regional and project development plans.

Properly planned at the landscape scale, biodiversity offsets can contribute to regional conservation and land-use planning, and to the priorities set out in national biodiversity strategies and action plans.

Government policy on biodiversity offsets (whether voluntary or mandatory) can facilitate better relationships between governments and developers with regard to the mitigation of biodiversity impacts. Where developers are operating under clear guidelines, they can plan and implement their offsets in an orderly and efficient way as part of the development project. This certainty can be beneficial not only for development projects, but is also characteristic of a jurisdiction that is a 'good place' in which to do business.

Where the design and implementation of biodiversity offsets are established as an active and on-going activity, businesses centred on the provision of offsets are likely to evolve. These industries can comprise new companies set up explicitly to undertake offsets through habitat establishment and restoration and can also allow existing companies such as those in the nursery trade and pest and weed control to expand their activities. Governments appreciate that these activities can benefit the economy and local communities by generating employment and revenue. For instance, the market for conservation banking in the US is estimated at approximately US $1bn per annum[3].

Biodiversity offsets generate additional private sector investments in conservation that add to the available resources contributing to conservation by governments' overall objectives for biodiversity conservation.

[3] Madsen et al, 2010

Taken together, these advantages mean that biodiversity offsets offer not only a risk management tool and potential business opportunity for companies, but a possible source of new and additional source of funding for biodiversity conservation and sustainable use activities. In this model that provides for the internalisation of environmental costs, public and private sector developers bear the costs of the conservation actions needed to offset their impacts, and this investment in conservation may be considered additional to national budgetary support for protected area networks and other *in situ* biodiversity activities.

However, biodiversity offsets should be treated with great caution: they should not be misused to allow inappropriate projects to proceed, and are only appropriate in some circumstances, where the mitigation hierarchy has been followed and the residual impacts are capable of being offset. Biodiversity offsets only succeed where there is adequate capacity to design and implement them, and adequate monitoring, evaluation and enforcement. In addition, it is important that national policy on biodiversity offsets results in additional investment in conservation, and that government does not simply reduce public sector commitments to conservation finance, transferring the costs of national conservation priorities to the private sector. A number of publications illustrate the danger of inappropriate use of biodiversity offsets and inadequate policy.

Some older and more biologically specialised components are more difficult to replicate or replace. There are species whose habitat may be impossible to re-create and some compensatory measures may never succeed[4]. The time scales required for restored sites to match the target state may be extremely long, in some cases ranging from several decades to centuries[5] .

There are also limitations on the metrics used to quantify losses and gains mainly reflecting the need to limit their complexity in order to achieve a process that can be operationally practical[6].Further, surrogate measures of biodiversity can obscure what is exchanged, allowing loss of rare and difficult to conserve biodiversity to be replaced by more commonplace biodiversity.

The likelihood that offset areas based on re-creation (for example revegetation) will follow a predicted ecological path has also been questioned, given that outcomes can be influenced to some degree by stochastic events[7] .

Offset policies can also be compromised by inadequate implementation. Offset outcomes are heavily dependent on the long-term management and protection of the offset site. Adequate standards, monitoring and compliance are critical to success. Non-compliance can lead to significant failure rates for offsets[8]. Sometimes the interests of agencies can be more aligned with those of development rather than the environment, resulting in poor compliance and over-simplified biodiversity measurement.

Offsetting may fail to protect biodiversity due to the requirement for trading to use simple commodities or units of trade and the inability of these to capture the complexities of biodiversity.[9]

[4] Morris et al, 2006
[5] Wilkins et al, 2003
[6] McCarthy et al, 2004
[7] Hilderbrand et al, 2005
[8] Race and Fonseca, 1996
[9] Walker et al, 2009

About this paper and BBOP

This paper is a contribution to the Business and Biodiversity Offsets Programme (BBOP)[10], a partnership of over 50 leading organisations and individuals including companies, governments, conservation experts and financial institutions from around the world working together to explore biodiversity offsets. The BBOP Advisory Group members represent groups in society (government, business, intergovernmental organisations, financial institutions, civil society) with diverse perspectives on environment and development from many different countries. This paper is an initial draft prepared on behalf of the BBOP Secretariat by the authors. It does not necessarily represent the views of the members of the BBOP Advisory Group. The authors recognise that many of the issues presented are complex and will benefit from more in-depth and detailed discussion. The main aim of the paper is to identify policy options at a general level in the anticipation of subsequent papers based on further research and consultation.

The paper offers a basic introduction to biodiversity offsets policy, describing a range of options open to governments and their advisers interested in establishing policy on biodiversity offsets. It draws on the experience of governments that have already developed and implemented biodiversity offsets policies. It also takes into account the practical experience of businesses in putting offsets into place on a voluntary basis, including those undertaken in collaboration with BBOP as pilot projects. The paper examines the principles underlying offsetting policy, identifies the various roles of government in offsetting schemes, looks at the connections to other policy areas and considers the significant implementation issues.

Following this introduction, section 2 sets out the fundamentals of biodiversity offsets and biodiversity offset policy, including the principles for best practice biodiversity offsets, the different approaches available to governments when considering an offset scheme and the different policy options for biodiversity offsets. Various ways of implementing offset policies, including through markets, are discussed.

Section 3 explores the possible roles for governments in developing and implementing policies on biodiversity offsetting. The roles include those of policy maker, regulator, market maker, broker and monitoring and compliance agency.

Section 4 looks at the ways in which biodiversity offsetting policy can be integrated with other policy areas including: environmental impact assessment, strategic environmental assessment, industry policy and whether offsets can be designed to offer multiple benefits (for instance, carbon and water).

Section 5 covers capacity issues, reviewing the requisite skills and resources a government may require to establish a biodiversity offsets scheme. This section also discusses cost recovery for situations where government services are provided.

Finally Section 6 looks at experiences in a range of situations around the world where biodiversity offsetting has been attempted, in order to draw out the key lessons for success.

1.2 Definitions

Biodiversity offsets

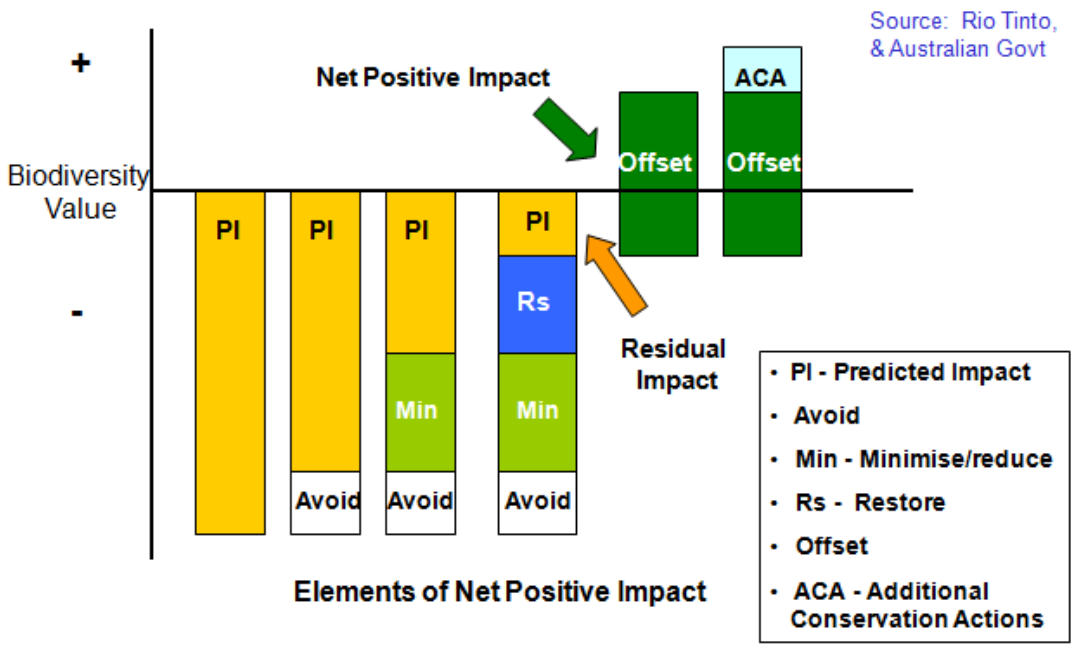
Drawing on law, policy and experience around the world, the BBOP partners have defined biodiversity offsets as measurable conservation outcomes resulting from actions designed to compensate for significant residual

[10] http://bbop.forest-trends.org/

adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity.

A key part of the definition is that offsetting should only apply after developers have taken steps to avoid and minimise the biodiversity impacts of their projects. Biodiversity offsets address any residual significant impacts after the appropriate avoidance, minimisation and restoration. This is illustrated in Box 1.

Box 1: The Mitigation Hierarchy



NB: This illustration shows a scenario where there is a residual impact to be offset. In other cases there may be no residual impact left after avoidance, minimisation and restoration

Biodiversity offsets compared with compensation

Following four years of work and an analysis of the basis for biodiversity offsets in national and regional policies around the world, BBOP agreed ten fundamental principles (see Box 3 on page 14) that define biodiversity offsets, and these can be summarised briefly as follows. Biodiversity offsets are: designed and implemented to achieve no net loss or a net gain of biodiversity; will achieve additional conservation outcomes; adhere to the mitigation hierarchy; recognise limits to what can be offset; are planned in a landscape context; involve stakeholders effectively in design and implementation; are designed and implemented in an equitable manner; are planned to secure outcomes that last at least as long as the project's impacts and preferably in perpetuity; are undertaken and communicated transparently; and document the appropriate use of sound science and traditional knowledge. Biodiversity offsets that follow these principles should achieve the best outcomes for biodiversity and manage the risks associated with using this tool. The principles are discussed further in section 2.1.

Essentially, there are two categories of response to projects' impacts on biodiversity:
(a) ***Biodiversity offsets***, which meet the definition and adhere to the principles above; and
(b) ***Compensatory conservation***, which involves some investment in biodiversity conservation as a result of a project, but does not satisfy these requirements. For instance, the compensation may only partially offset the impact, involve some net loss, conserve a different kind of biodiversity to that affected in a manner that doesn't meet the 'like for like or better' approach to ecological equivalence, or not be secured for the long term.

Market-based approaches: conservation banking and credits

Biodiversity is infinitely variable. Given the philosophy embraced in biodiversity offset policy all around the world of 'like for like or better', the goal of 'no net loss' and the necessity for equity and respect for the rights of indigenous peoples and local communities, biodiversity offsets are essentially a local and bioregional tool. Biodiversity offsets are generally required and planned within the same bioregion as the area impacted, to contribute to conservation of essentially the same biodiversity components and with a strong emphasis on ensuring local communities' needs are met. This means that biodiversity offsets are uniquely tailored to local circumstances and cannot be traded internationally, unlike carbon, where there is a single, global metric and unit (i.e. tonnes of carbon dioxide equivalent). Some countries establish conservation banking and designate a set of biodiversity credits as a means of defining offset requirements. These generally define the 'service area' within which credits can be purchased and traded, within a watershed or local bioregion and vegetation class.

A developer can provide its own biodiversity offset, for example on land the developer owns. Alternatively, a developer can enter into an arrangement with a third party for the provision of the required offset. These arrangements are generally made by purchasing biodiversity credits from a conservation bank (usually operated by a company), or from individuals and organisations that can provide biodiversity credits to the requisite standard. The developer pays the third party an agreed price in return for the requisite number and type of biodiversity credits that comprise the offset. Credits are quantified gains in biodiversity usually generated by actions that increase the extent, quality or security of habitat or species.

A conservation bank is an area of land where biodiversity credits are established in advance of any actual trading of credits for offsets. A conservation bank is thus an entrepreneurial project where an investor establishes credits in anticipation of future sales. Conservation banks are usually large relative to the size of the anticipated individual offsets. Banks have the characteristic of combining a number of individual offsets onto a single site.

Thus national or local trading in biodiversity credits and the use of conservation banks represent one way of implementing biodiversity offsets.

1.3 A brief history of biodiversity offsets

Over 30 countries or states have enacted laws or introduced policies that specifically require biodiversity offsets or compensatory conservation for particular sets of impacts (for instance, on wetlands, on certain nationally listed species, or on biodiversity in its entirety)[11]. In addition, biodiversity offsets or compensatory conservation is sometimes included in the conditions for project approval as a result of dialogue between the

[11] These countries include the USA, Australia, the European Union, Brazil and South Africa.

proponent of a project and the permitting authority, typically following an environmental impact assessment process. There is also a small but growing incidence of companies undertaking biodiversity offsets voluntarily.

Research in 2010 by the Ecosystem Marketplace, a sister programme to BBOP at Forest Trends, found 39 existing compensatory mitigation programmes around the world, ranging from programmes with active mitigation banking of biodiversity credits to programs channelling development impact fees to policies that drive one-off offsets. (See Box 2.) There are another 25 programmes in various stages of development or investigation. Within each active offset programme, there are numerous individual offset sites, including over 600 mitigation banks worldwide. The global annual market size is $1.8-$2.9 billion at a minimum, and the market is likely much greater, as 80% of existing programmes are insufficiently transparent for the Ecosystem Marketplace to have included their market size in this estimate. The conservation impact of this market includes at least 86,000 hectares of land under some sort of conservation management or permanent legal protection per year[12].

Box 2: Excerpt from State of Biodiversity Markets Report: Offset and Compensation Programs Worldwide, by Madsen, Carroll and Moore Brands, 2010, Ecosystem Marketplace.

Some countries are in early stages of adoption or investigation of compensatory mitigation,* while others have sophisticated and mature systems. But in all regions, compensatory mitigation is developed or developing around unique economic, political, institutional, and cultural circumstances that give rise to a variety of programmes.

In **North America**, biodiversity offset and compensation programmes are well-developed, particularly the US wetland and species compensation programmes and Canada's fish habitat compensation program. In total there are 14 active programmes and 5 in development in North America. The region sees a minimum of US$1.5-$2.5 billion in compensation payments per annum. This region also hosts the most offset credit banks of any region in the world.

The United States has seven active programs and three in development. Payments total US$1.5-$2.4 billion annually. Around 700,000 cumulative acres (283,280 hectares) have been restored or protected through US programmes. The two largest offsetting programmes, wetland and species mitigation, offer three mechanisms for achieving compensation: do it yourself, pay into a fund, or buy a third-party credit. Within this third form of offset credit baking there are 615 active and sold-out banks in the country.

Canada's compensation programmes are focused on fish habitat and wetland compensation, driven by a combination of compliance with federal and provincial policies, with varying levels of implementation. Six programmes exist in Canada, with one in development. These programmes cover five ecosystem/species types and protect around 180 hectares per year. Regional investment totals $6-$145 million annually, and there are currently 17 active and sold-out banks.

Offset programmes in Mexico are not as developed as those of its neighbours in North America. Yet, with programmes compensating landowners for conserving forest cover and requiring payment for deforestation due to industrial development, Mexico is well on its way to developing a sophisticated programme, ensuring a more direct link between development impacts and biodiversity conservation.

Five compensation programmes exist in **Central and South America**, with two in development. Most South American countries have developed Environmental Impact Assessment (EIA) laws that address impact mitigation, including Brazil, Argentina, and Chile. However, the majority of Central and South America has not developed biodiversity offset programmes. The exception is Brazil, with Colombia and Paraguay in the early

[12] Madsen et al, 2010.

stages of development. These programmes have varying degrees of enforcement, market infrastructure and institutional capacity.

There are currently no active offset programmes in **Africa**, but six are in development. South Africa is the leader in African offset policy development, with a national and two provincial policies in the works. While other countries have developed EIA law and some voluntary offset projects, the majority of the continent has little in the way of offset and compensation programme creation.

In **Europe**, biodiversity markets are still a developing idea. Four programmes have had offsets implemented, and an additional three programmes are in early stages of development. The largest European programme, Germany's Impact Mitigation Regulation, has at least 2,600 hectares conserved in compensation pools. Habitat banking has been piloted in France and is under investigation in the United Kingdom and in the European Union.

Four offset programmes exist in **Asia**, with another four in early development. Annual payments equal US$390 million and roughly 26,000 hectares are protected or restored annually. Asian offset-like programmes come mostly under the Environmental Impact Assessment, with EIA laws in Japan, South Korea, China, Mongolia, Pakistan, Thailand, Malaysia, Russia and India. The presence of EIAs in the region may lay a framework for biodiversity markets - two offset programmes/projects already in existence are located in Malaysia and Saipan. In addition to government-led actions, voluntary and industry initiatives, driven by increasing public criticism, are arising. At least one industry group has been exploring the use of biodiversity offsets in the agricultural industry.

Between **Australia and New Zealand**, there are twelve biodiversity offset programmes and five in development; the majority of those are compliance-based State or regional programmes implemented at the project level during the planning process, although two programmes offer in-lieu fee payment. About US$1.3 million goes to regional payments annually, with 523 habitat hectares restored or preserved each year; there are 42 ecosystem/species credit types in Australia's offset programs.

Overall, our research shows significant activity around the world with many compensatory mitigation programs in early stages of development. The global economic downturn of 2008 may have slowed market growth in regions with developed mitigation systems, but they continue to see credit sales; while regions without developed mitigation laws and markets are showing strong interest.

* In the State of the Biodiversity Markets Report, compensatory mitigation means the restoration, creation, enhancement, and/or in certain circumstances preservation of natural resources for the purposes of offsetting adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved. For the purposes of the SBM Report, compensatory mitigation represents a spectrum of practices that range from rigorous and measurable biodiversity offsets to less direct efforts to compensate for impacts through financial donations and land protection.

Wetland and conservation banking has been a feature of biodiversity policy in the USA for at least three decades, while biodiversity offsets and credit trading are comparatively new in Australia and Brazil. In other countries, such as South Africa, policy is already under development, and in a suite of other countries (e.g. Ghana, Uganda, Namibia, Vietnam, Malaysia, Mongolia) work is just starting.

Historically, the nature and scale of biodiversity offsets or compensatory conservation were calculated based on simple metrics such as area, the financial investment involved in the investment project, on some formula that identifies a subset of biodiversity values (timber value on the land, for instance), or simply negotiated as a financial package that the developer was prepared to invest, irrespective of whether the amount was adequate to cover the costs of sufficient offsetting activities. However, the last 10-15 years have seen a

growing interest in better metrics that endeavour to assess the nature, amount and quality of biodiversity lost as a result of the project and gained through the offset and to ensure properly quantified approaches to 'no net loss'. Recent metrics generally represent a combination of area and quality or condition of biodiversity. Some assess particular functions of biodiversity and others look at species viability assessments. Many assessment methods and different metrics exist worldwide. For example there are about 40 different wetland assessment methods in the United States.[13]

2. The basics of biodiversity offset policy

2.1 The basic principles of biodiversity offsets

Some core principles of biodiversity offsetting: objective, metrics and additionality

National laws and circumstances vary widely around the world, so there is no single 'correct' approach to designing and implementing a biodiversity offset, or to introducing national policy and regulation on this topic. In recognition of this, the Business and Biodiversity Offsets Programme has developed a set of basic principles that provide a framework for best practice biodiversity offsets. Provided these principles are adhered to, there is tremendous flexibility and any number of different ways in which biodiversity offsets can be designed and implemented and their success verified. These ten principles are shown in Box 3, below.

The foundation of a biodiversity offsets policy is the requirement for no net loss of biodiversity. The most basic objective of offsetting policy is that losses are mitigated by commensurate gains. Biodiversity value that already exists does not represent a gain and hence cannot provide an offset.

BBOP's definition of offsets includes reference to 'no net loss of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity.' A policy statement on no net loss will generally specify the values to which the policy applies. The key to implementing a no net loss policy is to specify units by which changes in these values can be measured. Given the complexity of biodiversity and its different aspects, such as species composition, habitat structure and ecological function, these metrics are usually surrogate measures, aimed at capturing some crucial elements of the overall value while keeping the measurement task relatively simple and cost effective. Nevertheless this is a difficult task as surrogate measures can involve problems of scaling and lack of transparency. These issues are not well understood and require further research.

Most biodiversity has been affected by human activity to some degree or other. The condition, quality and amount of biodiversity vary enormously, even within the same habitat type. One hectare may be pristine, with high levels of diversity and functionality, and another hectare of the same type may be highly degraded, depauperate and with few of its ecological functions intact. Because of this variability, area alone makes a poor measure of biodiversity, and loss and gain metrics often include a quality component.

Biodiversity offsets involve exchanging a residual biodiversity loss at one place for a biodiversity gain at another place. An important part of a policy is to define the 'rules' of this exchange process, usually referred to as the' like-for-like-or-better' criteria. The biodiversity in one place is never exactly the same as the biodiversity in any other place, so setting like-for-like criteria becomes an exercise in categorising biodiversity into classes or types within which exchange will be permitted. The design tension here is that high resolution classification with many but small types can provide a closer match between the loss and the gain, but also introduce less flexibility into the offsetting process, so it is more difficult to locate a matching offset.

[13] Salzman and Ruhl, 2005

Box 3: Principles on Biodiversity Offsets, developed and supported by BBOP Advisory Group members

Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development1after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity.

These principles establish a framework for designing and implementing biodiversity offsets and verifying their success. Biodiversity offsets should be designed to comply with all relevant national and international law, and planned and implemented in accordance with the Convention on Biological Diversity and its ecosystem approach, as articulated in National Biodiversity Strategies and Action Plans.

1. ***No net loss:*** A biodiversity offset should be designed and implemented to achieve *in situ*, measurable conservation outcomes that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity.

2. ***Additional conservation outcomes:*** A biodiversity offset should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place. Offset design and implementation should avoid displacing activities harmful to biodiversity to other locations.

3. ***Adherence to the mitigation hierarchy:*** A biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimization and on-site rehabilitation measures have been taken according to the mitigation hierarchy.

4. Limits to what can be offset: There are situations where residual impacts cannot be fully compensated for by a biodiversity offset because of the irreplaceability or vulnerability of the biodiversity affected.

5. Landscape Context: A biodiversity offset should be designed and implemented in a landscape context to achieve the expected measurable conservation outcomes taking into account available information on the full range of biological, social and cultural values of biodiversity and supporting an ecosystem approach.

6. Stakeholder participation: In areas affected by the project and by the biodiversity offset, the effective participation of stakeholders should be ensured in decision-making about biodiversity offsets, including their evaluation, selection, design, implementation and monitoring.

7. Equity: A biodiversity offset should be designed and implemented in an equitable manner, which means the sharing among stakeholders of the rights and responsibilities, risks and rewards associated with a project and offset in a fair and balanced way, respecting legal and customary arrangements. Special consideration should be given to respecting both internationally and nationally recognised rights of indigenous peoples and local communities.

8. Long-term outcomes: The design and implementation of a biodiversity offset should be based on an adaptive management approach, incorporating monitoring and evaluation, with the objective of securing outcomes that last at least as long as the project's impacts and preferably in perpetuity.

9. Transparency: The design and implementation of a biodiversity offset, and communication of its results to the public, should be undertaken in a transparent and timely manner.

10. Science and traditional knowledge: The design and implementation of a biodiversity offset should be a documented process informed by sound science, including an appropriate consideration of traditional knowledge.

This dilemma can be eased by grading the like-for-like-or-better criteria according to some measure of the significance of the biodiversity components suffering the impacts. Thus the like-for-like criteria for a very significant biodiversity component may be set such that a close match is required for the offset while for lower significant losses the criteria may be quite flexible, allowing exchange within a wider range of biodiversity types, or higher conservation value.

The exchange process inherent in biodiversity offsets (i.e. the approximation of 'like-for-like') means that the metrics used to measure losses and gains must be capable of providing equivalence between different biodiversity components.

This type of like-for-like-or-better design also allows the introduction of an arrangement that provides further flexibility while at the same time allowing a biodiversity benefit. 'Trading up' refers to the ability to match a loss with a gain in a different kind of biodiversity, provided that it is of higher conservation value than the loss. It is important that the level of segmentation of biodiversity types, and the 'trading up' options (for biodiversity types of higher conservation value), are primarily based on conservation drivers rather than on the convenience of locating matching offsets.

Like-for-like-or-better policies can include the following criteria:

- Type of biodiversity component(e.g. vegetation type, habitat type, species type)
- Vicinity (where the offset can be located e.g. within the same bioregion)
- Timing (to address time gaps between the impact and the offset)
- Ecological function
- Quality or condition requirement

Box 4: Introduction to the concept of 'gain' in biodiversity offsets:

'G**ain'** is an increase in the extent and/or quality of biodiversity. Three categories of gain can be distinguished – improvement gain, maintenance gain and security gain. It is useful to distinguish these types of gain because they arise from different actions and commitments. Commitments to undertake such activities may be made by different parties, so the categorisation allows the overall gain to be calculated, and parts of it attributed to separate parties.

- *Improvement Gain* results from management commitments beyond existing obligations under legislation to improve the current habitat condition. Typical actions leading to an improvement gain include reducing or eliminating weeds, enhancement planting or the reintroduction of fauna species.

- *Maintenance Gain* results from commitments that contribute to the maintenance of biodiversity quality and condition over time (i.e. avoiding any decline). It includes foregoing entitled activities that could otherwise damage or remove biodiversity, such as grazing or firewood collection[1].

- *Security Gain* results from actions to enhance the security of biodiversity (i.e. avoiding loss through clearing or conversion), either by entering into an on-title agreement, by transferring private land to a secure public conservation reserve or by upgrading the protected status of public land. (Just as a decision to elevate the security arrangements for a site can generate security gain, a decision that increases the risk of loss through clearing could be considered to generate a security loss.)

Metrics for gain can include area, combined area and condition, population levels of particular species and species persistence. The calculation of security gain and loss requires estimates of the long-term risk of loss of vegetation through clearing under the different security arrangements available in the jurisdiction. In any given offsetting scheme, the gains and losses are measured in the same units.

For more information on the calculation of loss and gain, see the Biodiversity Offset Design Handbook Step 5*, and its Appendices** that describe a number of different metrics and methods for loss/gain calculations.

* www.forest-trends.org/biodiversityoffsetprogram/guidelines/odh.pdf
** www.forest-trends.org/biodiversityoffsetprogram/guidelines/odh-appendices.pdf.

For example the like-for-like rules may allow the clearing of an area of grassy woodland to be offset by gains in an area of lowland forest through a trading up provision, provided the grassy woodland is generally well conserved within its bioregion and the lowland forest is a higher conservation priority.

To be effective, biodiversity offsets need to be secure and in place for as long as the loss exists. Often the loss is permanent meaning that the offset must also be permanent. In jurisdictions where private property rights are well defined and protected area legislation is in place, security and permanence can usually be established through the use of legal devices such as covenants, easements and new conservation reserves. In other circumstances, for example where customary land is found, more innovative approaches, such as long-term agreements with communities, will be required.

An important factor in the development of biodiversity offset policy is the underlying body of biodiversity information. A biodiversity offset scheme is reliant on the information base in a number of ways including:

- To inform the measures of loss and gain
- To enable categorisation of biodiversity significance (priorities)
- To enable the like-for like-or-better exchange

Typically the basic information required for biodiversity offsets includes the extent and type of ecosystems, biotopes or habitats, their quality or condition, conservation status (e.g. 'threatened'), evolutionary significance/ centre of endemism, migratory or aggregatory species records and ranges/distributions, and species' habitat requirements. Some information is required at a regional scale to provide context (for example in order to consider the relative significance of a site, importance of connectivity and corridors in the landscape, priority areas for protection or protected area expansion, etc.), while some may be collected at a site level. In addition, information on national or regional conservation plans, strategies and priorities is invaluable in focusing offset efforts. Information on the cultural and use values of biodiversity is also important.

Where the available biodiversity information is relatively limited, a biodiversity offsets policy can still be implemented, but its complexity will reflect the nature of the information.

2.2 Different kinds of offsets

There are broadly two kinds of biodiversity offsets or compensatory conservation:

(a) ***Voluntary biodiversity offsets or compensation***, which a developer undertakes in circumstances where there is no legal requirement to do so, because it perceives a business advantage (such as license to operate, reputational benefits, competitive advantage, market share, etc); or

(b) ***Regulatory biodiversity offsets or compensation***, which are required by law.

Biodiversity offset policy can be implemented in several different ways at a country or state level. In some cases the initiative for offsetting may be left to the private sector, as a voluntary choice (see option (a), above). In other situations (option (b)), a government may choose to support the private sector with official policy, which may offer incentives or set out requirements for biodiversity offsets for certain activities or impacts. Each of these approaches will be discussed in turn.

Voluntary offsets

Companies may choose to undertake biodiversity offsets voluntarily, based on a business case. Voluntary offsets are part of corporate responsibility and good environmental practice and can help to secure a license to operate. Good working relationships with government and local communities can save companies time and money through early permit approval. Many large banks place biodiversity conditions on their loans for development projects. These and other elements of the business case are summarised in Box 5.

While it is perfectly possible for companies to undertake voluntary biodiversity offsets in the absence of any formal government intervention, some government policy can be very beneficial. As a minimum such policy can address:

- General recognition of the benefits of biodiversity offsetting;
- General statement of support for companies to undertake voluntary offsets;
- Facilitation of access to biodiversity information;
- Government willingness to consult with companies on the facilitation of voluntary biodiversity offsets.

Box 5: The business case for voluntary biodiversity offsets

A company's biodiversity impacts can lead to significant regulatory, financial and reputational risks. Governments, financial institutions, and civil society increasingly expect developers to take full responsibility for such impacts. In many cases, biodiversity offsets offer companies a way to demonstrate no net loss of biodiversity, improve outcomes for local communities, and reduce operational and project development risks. Companies voluntarily developing biodiversity offsets forge good relationships with regulators and stakeholders, which can contribute to securing permits and broader social license to operate. Adherence to internationally recognized best practice principles (e.g. those developed by BBOP), can help businesses build their reputations as leaders, manage biodiversity-related risks, and shape the regulatory requirements increasingly being developed by governments.

Elements of the business case:

License to operate and regulatory goodwill; managing risk and liability; strengthening reputation: Designing and implementing high quality biodiversity offsets can help companies work effectively with local, national and international stakeholders. Showing efforts to achieve no net loss of biodiversity improves a company's reputation and reduces anti-project sentiments and project risk. Adopting best practice helps streamline permit approval, thereby lowering the risk of project delay and significant unanticipated start up and operational costs.

Operational efficiency and cost savings: Biodiversity offsets may provide a more cost-effective solution than a sole focus on on-site mitigation measures. By working through a structured approach to avoidance, minimisation, restoration and offsets, companies may reduce overall costs while achieving greater conservation results. Companies with good relationships with regulators and local communities will also enjoy the financial benefits of operational efficiency, avoiding the costs associated with revoked licenses or blockaded facilities.

Access to finance: Companies seeking project finance from the International Finance Corporation, or from the more than 60 major banks that have subscribed to the Equator Principles, are encouraged to consider biodiversity offsets. Applying best practice can help developers secure credit and investment.

Competitive advantage: Through voluntary adoption of best practice on biodiversity offsets, companies can distinguish themselves from competitors who may be bidding for the same licenses or seeking market share. Leadership companies position themselves favourably in an environment where regulator and financier expectations are increasing and competitive advantage may be necessary to win concessions, attract finance and gain market share.

Shape policy: Companies undertaking biodiversity offsets gain 'first mover' advantage and a seat at the table where national policy and international best practice standards on biodiversity offsets and compensation are being developed. They can contribute to the international adoption of policies that work well for business.

Standards: Adopting voluntary standards helps companies demonstrate the quality and effectiveness of their biodiversity offsets, which helps avoid controversy and uncertainty. BBOP is working with as many stakeholders as possible to develop (by 2015) standards on biodiversity offsets that enjoy broad societal support.

Policy and incentives

Under this approach a government would develop a policy aimed at positively encouraging biodiversity offsetting within its jurisdiction. Such a policy would often be part of a broader biodiversity conservation policy that could also include provisions such as setting aside protected areas and the development of plans for the protection and recovery of threatened species.

An offsetting scheme can be introduced in the absence of highly detailed biodiversity information systems as long as there is sufficient information to enable these mechanisms to function in even a basic way. As time goes on, the information base can be improved and the offsetting mechanisms can be enhanced accordingly.

Beyond the basic biodiversity informational needs for offsetting policy (such as data and mapped classifications of biodiversity, biodiversity condition, threatened species records, and species' habitat requirements) , broad land use plans that include biodiversity conservation can be helpful where there is an objective to locate and aggregate offsets strategically at the landscape scale.

In addition to setting out objectives and core principles, biodiversity offset policy usually addresses the requirement for technical standards and methodologies. The policy may not contain these standards and methodologies, but would generally at least establish the processes by which these subsidiary documents will be prepared and authorised. Typical subjects for these documents are:

- Methods for measuring losses and gains
- Standards for habitat management
- Standards for habitat re-creation
- Methods for classifying biodiversity components by significance

As part of a biodiversity offsetting policy a government may choose to offer incentives for developers to implement offsets according to the policy. These incentives can influence the business case through factors such as an enhanced case to government for project approval, facilitated access to government-held biodiversity information and assistance with local community relations. Alternatively, more direct incentives such as tax breaks and development bonuses could be offered within the policy framework.

An incentive policy could also extend to facilitating third party offsets for developers. This facilitation could include assistance with finding areas that meet to like-for-like criteria, helping with landowner negotiations and addressing any associated land use planning issues.

Regulatory approaches

Under regulatory approaches, biodiversity offsets are made mandatory for certain defined activities or impacts. Regulatory approaches are generally introduced in circumstances where the government concerned recognizes that ongoing biodiversity losses are unsustainable and are compromising the integrity of natural resources and the community benefits flowing from these resources. The aim of regulatory approaches is to provide a response to biodiversity losses within the jurisdiction that sets a level playing field for all entities with impacts on biodiversity, introduces clarity and legal certainty on their rights and responsibilities and achieves a greater and more consistent biodiversity outcome than will occur through purely voluntary approaches.

The regulatory requirement for biodiversity offsets is usually integrated into the development approval processes. Development approval processes can include environmental impact assessments, land use planning laws and legislation covering permitting for specific industry sectors such as exploration and development within the extractive sectors. The availability of an offset should not be seen as an automatic green light of approval, regardless of the significance of the impacts. Furthermore the unavailability of an appropriate offset may in some cases be sufficient reason to modify or reject a proposal.

The standards and methodologies that back up offset policy can be given a statutory basis in a regulatory approach. In most cases this is done by a basic and very simple reference to the requirement for offsets and 'no net loss' within the governing law, so that policy or guidance documents can be prepared and amended from time to time through an administrative process without constant recourse to Parliament. This allows improvements to standards and techniques to be incorporated without the necessity of amending the original legislation.

2.3 Different kinds of policy and legal provisions on offsets

The different kinds of regulation

Governments can introduce biodiversity offsetting policy and regulation in two basic ways. The first is through specific provisions on biodiversity offsets (and perhaps other aspects of biodiversity conservation) and the second is to incorporate offsetting provisions into other laws and policies that deal with environment impact assessment (EIA), land use planning, strategic environmental assessment, sectoral policies or broader sustainable development or environmental policies.

The decision on which approach to take depends to some extent upon the legal customs of the jurisdiction concerned, and also upon the scope of the other laws relative to the intended scope for biodiversity offset requirements. For example, in a particular jurisdiction the EIA laws may only cover large projects or projects in particular industry sectors (for instance, construction and extractives, but not agriculture). If the intention is to introduce offsetting for a wider range of projects, it may be necessary to introduce a specific law requiring offsets for the desired scope.

2.3.1 Specific policy and law on biodiversity offsets.

Biodiversity offset regulation will generally deal with the main matters of offsetting policy as discussed above, either directly or through incorporation by reference. Other provisions that are often included in these laws include:

Exemptions for certain impacts on the basis that they are very small, the biodiversity is highly degraded or for safety and hazard reduction reasons;

- Situations of temporary loss of biodiversity such as sustainable timber harvesting;
- Reference to entitled or customary uses that do not require approval and hence are outside the offsetting regime;
- Reference to provisions that establish a 'duty of care' to the environment (such as the control of pests and weeds as such fall below the additionality requirement.

2.3.2 Integrating provisions on biodiversity offsets into impact assessment, planning requirements and other relevant policy and law

There are many different frameworks for biodiversity offset policy and law, depending upon the existing institutional and legal arrangements prevailing in the jurisdiction. The most common settings for biodiversity offset policy are EIA, SEA, planning law, sectoral law and as part of a suite of environmental offset policies. In some cases, biodiversity offsets may be included in broader policy frameworks established to promote sustainable development.

Biodiversity offsets and EIA

In many countries, Environmental Impact Assessments (EIAs) provide the necessary framework for governments to negotiate biodiversity offsets with developers, particularly for larger scale projects. In others where EIA is not a regulatory tool, or where activities having a significant negative impact on biodiversity do not trigger the need for EIA (typically small projects in some countries), other approaches would need to be used. BBOP has prepared a resource paper on biodiversity offsets and impact assessment that offers more detail than this short summary.[14]

From a company's perspective, a project's final design and associated environmental management plan is generally linked to issues and risks identified during the EIA. However, in order for the EIA to act as a trigger for biodiversity offsets, the requirements of the EIA system itself need to be robust and transparent: to ensure that the full mitigation hierarchy is followed; that there is a reliable measure of residual impacts on biodiversity and their significance; that biodiversity offset negotiations take place with stakeholders; and that realistic and practicable offset proposals are prepared. Offsets should not be seen as attempts by the developer to 'buy-off' officials.

There are some challenges to integrating consideration of biodiversity offsets within the EIA process: depending on the available information, EIAs may need to be conducted on a timescale that does not synchronize with the biodiversity being studied. For instance, it may take more than a year to understand potential seasonal impacts and to consider which aspects of a site's biodiversity are priorities for conservation

[14] http://bbop.forest-trends.org/guidelines/eia.pdf

efforts. By contrast, EIAs are often completed within a period of six to nine months. In addition, some conservation organizations have expressed concerns that, since EIAs are usually paid for and approved by the companies causing the environmental damage, they may underestimate the damage caused or the offsets needed to compensate for the damage.

However, from an efficiency perspective, and where EIAs are required by law, it can make very good sense from the company, stakeholder and government perspectives to integrate biodiversity offsets with regulatory requirements. However, for 'good practice', it is important to ensure that:

- EIA or its supporting policy framework includes targets to achieve 'no net loss' of biodiversity, translated into country and context-specific indicators
- EIA requires the avoidance and minimization steps for all impacts on valued biodiversity.
- EIA requires that significant residual impacts are offset.
- EIA should address all components of biodiversity affected, including ecological and evolutionary process and functional aspects
- EIA should address the use of cultural values of biodiversity to affected parties.
- EIA needs to consider impacts beyond the site boundaries, at the landscape scale.
- EIA needs to address indirect and cumulative impacts.
- EIA should evaluate the effectiveness and risks of proposed measures to minimize and restore/ repair impacts; that is, it must provide a reliable measure of residual negative impacts on biodiversity.

An offset can be integrated with the EIA process to deliver 'no net loss', provided that the above requirements are met. Details about implementation of the proposed offset should then be incorporated in an environmental management plan ('offset management plan') or Biodiversity Action Plan.

Biodiversity offsets and SEA

The purpose of Strategic Environmental Assessment (SEA) is to ensure that the environmental consequences of a proposed policy, plan or programme are appropriately addressed at earlier stages or higher tiers of planning and decision-making than would take place for a project through EIA. Governments can use SEA to establish an analytical framework for assessment of individual project proposals through EIA or other planning processes in a hierarchical model that sets objectives through policy making and planning, and assesses alternative development options, cascading down to the level of project planning and EIA. SEA may draw on results of other landscape level planning initiatives that might clarify biodiversity, conservation and development objectives and provide a platform for comparing alternative development scenarios and their compatibility with these objectives. Individual projects can then be designed to meet policy goals and plan objectives. When planning for biodiversity offsets, a tiered system like this, especially if backed up by comprehensive spatial data on the distribution and significance of biodiversity and priority areas for biodiversity conservation in the landscape, can make it much easier to determine how biodiversity offsets might complement policies and contribute to national or regional conservation objectives.[15]

Biodiversity offsets and planning law

In many countries, the planning process, with its formal system of applications and enquiries, offers another potential trigger for dialogue on biodiversity offsets between developers and regulators. Indeed, environmental and social works are often required as a condition for planning approval, or as a form of

[15] Further information about SEA and biodiversity offsets may be found in http://bbop.forest-trends.org/guidelines/eia.pdf

'planning gain'. For instance, in the UK, section 106 of the Town and Country Planning Act can be used by authorities to require developers to undertake compensatory conservation activities. Just as with EIAs, certain underlying conditions may be needed for this trigger to work successfully, such as clear guidelines, tax breaks and density bonuses.

Biodiversity offsets and sectoral policies (mining, oil and gas, fisheries, etc)

Policy on biodiversity offsets can be incorporated into national policy relating to particular industry sectors. This could be done with a view to establishing the offset policy within a sector that was anticipated to generate significant biodiversity impacts, or where the nature of the industry sector required particular policy approaches that would not be appropriate for a policy applying to developments generally. Biodiversity offset provisions can thus be integrated into sectoral law and policy concerning, for instance, oil and gas; mining; electricity supply; forestry; fisheries; palm oil and other agricultural sectors; and tourism.

Biodiversity offsets and other environmental offsets (e.g. carbon, water, social issues) and Payments for Ecosystem Services

Governments may have policies that provide for offsetting a range of environmental impacts. Some governments (such as Western Australia and Queensland) have a broad, encompassing policy on 'environmental offsets'. Such policies may have subsidiary programmes on particular types of offsets. Other governments may introduce one or more thematic offset policies (e.g. biodiversity offsets, carbon offsets, wetland offsets and even social offsets) without an overarching environmental offsets policy. Other governments have Payments for Ecosystem (PES) Schemes[16]. These schemes may involve a variety of different credits.

In any of these cases, questions will naturally arise as to whether biodiversity offsets and other types of offset or PES schemes can co-exist, and particularly whether there can be an 'overlay' of more than one scheme on the same piece of land. Generally speaking, two mechanisms for coordinating such different schemes have been considered, known as 'bundling' and 'stacking'.

'Bundling' refers to regulatory arrangements where credits from a single site are defined to include more than one environmental good or service. Thus a credit might be defined that incorporates both biodiversity gain and sequestered carbon from a revegetation site. 'Stacking', on the other hand, refers to arrangements where different and distinct types of credits can be generated from a single site. In the example above, separate biodiversity credits and carbon credits would be available for offsets from the revegetation site.

Bundling and stacking remain controversial concepts, with concerns raised about 'double dipping'[17], site management incompatibilities and contractual conflicts. A very important topic for consideration is how the

[16] The Economics of Ecosystems and Biodiversity (TEEB, 2009) study defines ecosystem services as the 'direct and indirect contributions of ecosystems to human well-being' and categorises them into regulating (e.g. water purification, carbon sequestration, flood attenuation); provisioning (e.g. food, fuel, freshwater, timber); cultural services (e.g. for spiritual and aesthetic benefits); and habitat (e.g. maintenance of genetic diversity). Note that 'supporting services' are incorporated under ecological processes, rather than as a category of 'services. The Millennium Ecosystem Assessment (2005) defines four categories of ecosystem services: *Provisioning services*: The goods or products obtained from ecosystems such as food, freshwater, timber, fiber and other goods. *Regulating services*: The benefits obtained from an ecosystem's control of natural processes such as climate, water flow, disease regulation, pollination and protection from natural hazards. *Cultural services*: The non-material benefits obtained from ecosystems such as recreation, spiritual values and aesthetic enjoyment. *Supporting services*: The natural processes such as erosion control, soil formation, nutrient cycling, and primary productivity that maintain other services.

[17] Double dipping is when the person generating the credit(s) sells the same conservation management intervention to different buyers.

'additionality' needed for a biodiversity offset (and indeed for most other types of offsets) can be ensured. Policy development on 'bundling and stacking' is still in its infancy, and many of the related issues remain to be resolved. BBOP's Guidelines Working Group is exploring this topic.

2.4 Ways of implementing biodiversity offsets

The discussion thus far has considered the basics of biodiversity offsetting and the main policy options for government seeking to implement an offsets arrangement. These considerations have focussed on the processes for specifying biodiversity offsets in relation to defined impacts. However, specifying an offset in terms such as size, type, quality and locality is only half of the task. The next challenge is for the developer to discharge the obligation to implement the offset. There are three main approaches to this task of implementing biodiversity offsets: developer-initiated, in lieu fees and market mechanisms. Whichever approach is used, it will need to address key considerations such as identifying roles and responsibilities in the governance, management, monitoring and enforcement of the offset; how risk is assigned; and how the long term security of the offset is assured through legal and financial arrangements. These issues are discussed a little further in section 3, and are also the subject of BBOP's 'Offset Design Handbook'[18].

Developer initiated offset implementation

In this approach, while government may have introduced policy that encourages or requires biodiversity offsets, it generally takes a non-interventionist stance on how offsets should be implemented, and particularly on the task of finding offsets. The onus rests with the developers to find their own offsets (whether the offsets themselves are voluntary or required by regulation). This method can be ineffective in terms of offsets and unpopular with developers for a number of reasons:

- Identifying and securing appropriate offset areas is often outside the core expertise of developers, particularly smaller companies;
- It can be a time- and resource-consuming task;
- Projects or companies may 'move on' before an appropriate offset has been located.

In lieu fees

Under this system a government agency stipulates a payment from the developer with the intention of deploying the funds at a later date to find a suitable offset. This approach is often favoured by developers because their offset requirements can be resolved quickly and with certainty through a single payment which sheds their liability for the offset. In lieu fees can allow aggregation of individual offsets into larger, more beneficial areas. However from a broader perspective in lieu fees have a number of disadvantages including:

- The risks associated with finding the offset are not reduced but merely transferred from the developer to the government agency;
- The agency is required to estimate the cost of the future offset at the time of the in lieu payment. As this cost is not accurately known, the estimate will be either too low (in which case the agency will be short of funds to implement the offset), or too high (in which case the developer has paid an excessive fee).

[18] BBOP Biodiversity Offset Design Handbook. 2009. http://bbop.forest-trends.org/guidelines/oih.pdf

- In lieu fee schemes can accumulate large funds over time. In practice the tendency is for the implementation of offsets to be incomplete and sometimes for the funds to be diverted away from biodiversity offsetting to other 'good environmental causes'.

Market mechanisms

Markets can be used to supply biodiversity offsets for developers. These markets do not usually develop spontaneously, but require government intervention to set up the key components. Properly designed and operated, markets can be very effective in supplying offsets in a timely and cost-effective manner. However, biodiversity offset markets are subject to all the traps and limitations of markets everywhere.

However offset markets have some unusual characteristics which challenge general economic thinking about markets. Thus the primary purpose of an offset market is as a tool for effectively supplying biodiversity offsets as part of a biodiversity conservation policy. Market efficiency is an important but secondary goal.

Furthermore there is no aspiration to expand the offset market for its own sake. After all every offset is associated with a commensurate biodiversity loss and the overarching policy objective is the reduce impacts on biodiversity. Thus for no net loss biodiversity offsetting there is no biodiversity benefit from more offsetting and a larger offset market.

2.5 The design of offset markets

2.5.1 First party and third party offsets

In some circumstances a developer can provide a biodiversity offset on their own land. In this case the developer takes on the responsibility for the establishment, management and ongoing protection of the offset site. This situation is sometimes referred to as a first party offset. However many developers are reluctant or unable to provide their own offset because:

- They do not own the appropriate land or biodiversity components on which a suitable offset can be based;
- They lack the capacity and expertise required to establish and manage land and biodiversity;
- Their project has a fixed term and they do not want to be committed to ongoing obligations associated with the project's offset.

The alternative is to reach agreement with another person or company to provide the biodiversity offset – a third party offset. This is the basis for the offset market, demand for offsets from developers and supply of offsets by other landowners.

The basic elements for an offset market are units of trade (credits), trading rules and credit registers.

2.5.2 Biodiversity credits

Offsetting is a balancing of loss and gain and credits are units of gain that can be traded in an offset market. The key consideration for the utility of credits is that they meet all the requirements for gain as specified in the offset policy of the jurisdiction. So, for example credits are measured using the same units used for

measuring the gain. If the gain is required to be ongoing, then credits must also be permanent. Generally whatever standards and processes apply to the establishment, measurement and protection of gain must also apply to the credits.

However credits have some characteristics over and above their correspondence to gain. Credits are bought and sold in the offset market so they also property. There can be some uncertainty about the status of credits as property in some jurisdictions because biodiversity (and other types of credits) are novel and untested. It can be beneficial to formally establish biodiversity credits through legislation to remove any uncertainty. Such uncertainty can undermine confidence in the market if buyers and sellers are unsure about exactly what rights they are exchanging in a credit trade. Governments can engender confidence in the offset market by establishing biodiversity credits in law. Clear land tenure is critical for the satisfactory operation of operation of offsets in general, and clear property rights for credits similarly important for market based approaches to their implementation.

While it is useful to legally recognise credits as property it is important to restrict their use to the function of providing offsets or for contributing to biodiversity conservation more generally. Credits should not be able to be used for security for debt as this could compromise the 'secure and ongoing' requirement where they are used as biodiversity offsets.

Because biodiversity credits are designed to implement and deliver biodiversity offset requirements, they need to be fit for this purpose. This implies that credits need to comply with the policies and standards that apply to offsets themselves. Compliance with these requirements can be achieved in a number of ways including through industry standards and government-operated registers. These standards serve to minimise the risk to the environment arising from poorly performing offsets and also provide certainty to developers that in purchasing the credits they have responsibly discharged their commitment to the provision of the offset.

2.5.3 Trading rules

In addition to clarifying the property status of credits, governments can also facilitate the offset market by formulating trading rules. These rules generally specify the processes and limitations on trades and can include rules that address:

- Recognition of processes and standards for establishing and cancelling credits;
- Proof of ownership of biodiversity credits;
- Process for the change of ownership of credits;
- Processes for extinguishing credits that have been used in an offset;
- Accounting where biodiversity credits with different metrics or management can coexist on the one site.

The issue of accounting for different credits on the one site can arise where the offset policy requires more than one measure of biodiversity to be included in the loss and gain consideration, for example where there is a general measure for habitat and another measure for a particular species. In this example offsets will comprise various combinations of the two measures. The task of compiling third party offsets is greatly facilitated if the two types of credits can be traded independently. However if there is any crossover in the metrics for the two credits (for example the trees may be part of the habitat measure as well as being a measure in their own right), there needs to be a rule to cover the separation (unbundling) of the two credit types and for taking into account any double counting of gain.

More broadly where there are separate management plans for different types of credits, these also need to be examined (for example biodiversity and carbon). It may be that the measures of the benefits are fully separate, but the actions in one management plan have a (negative) impact on one or more of the metric components of another benefit. In this case the interaction is not through common metric components in the measures, but through management actions that have impacts on more than one measure.

2.5.4 Biodiversity Credit registers

Biodiversity credit registers are another important component of an offset market. Registers serve two main functions:

- To be the authoritative record of the number, location, characteristics and ownership of biodiversity credits in the jurisdiction;
- To provide quality assurance for the registration (creation) of credits.

Registers usually provide the documentation for 'proof of ownership' and guard against 'double-dipping' (inappropriate bundling and stacking) by recording credits that have been used for offsets.

A marketplace

Governments can assist the establishment of biodiversity offsets markets by facilitating the establishment of marketplaces. A marketplace for biodiversity for biodiversity credits will be virtual rather than physical and will comprise brokers and traders. Brokers arrange trades between buyers and sellers within the like-for-like criteria that apply. Traders may own credits themselves and sell these directly to developers. Governments can build buyer and seller confidence in these institutions by encouraging brokers and traders to work through the official credit register and by requiring them to have probity plans and probity audits.

2.5.5 The design of biodiversity offset markets

The design of a biodiversity offset market needs to be tailored to the nature of the demand and supply of offsets and the offsetting processes that exist in the jurisdiction. The biodiversity offset policy can have a significant influence on the level and nature of demand and supply.

The like-for-like rules (and including provisions for trading up) set the number of unique credit types and the degree of segmentation in the market. Like-for–like rules that establish a small number of unique types result in low market segmentation. However this can also mean that different biodiversity types have been combined. Depending upon the level of variety existing across the jurisdiction, this could be taking the diversity out of the biodiversity. Conversely if the like-for-like rules establish many credit types this will reflect the biodiversity more accurately, but result in higher market segmentation.

The general level of demand is itself influenced by scope of the offset policy and in particular by the settings for exemptions, the types of habitats and species required to be offset, and any thresholds applying to the size or nature of impacts.

The degree of segmentation and the level of demand interact to influence the types of offset supply mechanism that evolve in the market. These mechanisms include conservation banks, aggregated offsets, bespoke trades and 'over-the-counter' arrangements.

A conservation bank is a mechanism where biodiversity credits are established in advance of any losses they may be used to offset. A bank is an entrepreneurial venture that requires up-front investment into the credit site. A conservation bank is usually designed to supply offsets over time for a multiple number of losses.

In contrast a bespoke trade is one where a credit site is established to supply the offset for a specific, known loss. The credit site is not generally established in advance, but only in response to the particular demand. Subsequently there is an interval between the agreement to a bespoke trade and the actual establishment of the offset. Sometimes this interval can affect the completion of the project requiring the offset. However a bespoke trade is a less risky proposition for the credit supplier.

An aggregated offset is similar to a conservation bank except that the offset demand or requirement is known in advance and the aggregated offset can be specifically designed to compensate for a particular set of biodiversity impacts. An aggregated offset draws together the offset requirements of a number of projects where the biodiversity losses are known and supplies the required credits from a large single site or series of connected sites.

Over-the-Counter schemes are similar to conservation banks but are designed to supply small offsets where it is particularly important to minimise transaction costs. A government agency with responsibility for approving or permitting small biodiversity impacts can establish an arrangement under which it sells credits for the corresponding offsets 'over-the-counter' at the time of issuing the permit. These credits are established in advance (i.e. a small conservation bank) either by the agency or by through a private supplier.

A question arises here as to what extent the biodiversity offset policy should be formulated to provide a well-oiled offset market, for example by combining many biodiversity types together so the market could be supplied by a small number of large habitat banks. To do this may be to lose sight of the purpose of biodiversity offset policy, which is to contribute to biodiversity conservation in the jurisdiction. Nevertheless it is important when developing biodiversity offset policy to consider its influence on the likely form and effectiveness of the related offset market.

Biodiversity offset markets should also address other forms of risk for buyers and sellers. Developers are buying credits in the market with a view to presenting the credits to the permitting agency to fulfil the developer's offset obligations. Developers need to be certain that they are buying the correct type and quantity of credits. The market design needs to incorporate systems for the developer to obtain confirmation of the acceptability of the proposed credit purchase. This is particularly important in bespoke trades.

Small-scale landowners considering entering the market as suppliers can face considerable upfront costs for site assessment, biodiversity management plans and works, and permanent protection covenanting. The market design should allow such suppliers to come into the market in a staged manner so that they can manage the financial risk associated with these outlays. They should be able to make the sequential commitments as demand for their credit types becomes more certain.

Whether or not conservation banks arise in an offset market will depend on the investors' assessments of the risks involved with the future demand for the credits that could be established in the banks. The offsetting like-for-like rules (including any 'trading up' provisions) that set up the credit categories can have a major influence on this question. Where credits are defined in broad categories, there is potential for one offset site (bank) to provide like-for-like matches for a number of impact or loss sites. Conversely, where credit categories are narrowly defined a bank will potentially match up with a smaller range of impact sites.

Thus in general banks could be expected to be more viable where the like-for-like rules and the credit categories are broad, and vice versa. However broad like-for-like rules can mean that important distinctions between biodiversity values are obscured and subsequently some of these values may be lost in the offsetting process.

The viability of conservation banks is not just reliant on the like-for-like rules. The demand for offsets varies geographically due to the interaction of the location of development and the spatial distribution of biodiversity values. Banks can be feasible in situations even where relatively narrow like-for-like rules prevail when the demand for offsets is concentrated on a relatively small number of credit types.

2.5.6 The benefits and risks of conservation banks

Conservation banks and aggregated offset have a number of benefits, but also some associated risks and disadvantages. In summary the main benefits are:

- A number of offsets can be consolidated into a large contiguous site which can have higher habitat and security values;
- The conservation effort can be concentrated into one project which can facilitate more specialist input to offset design and management;
- A conservation bank can have landscape-scale benefits by providing connectivity and pre-empting future fragmentation;
- There can be cost savings from economies of scale and reduced transaction costs;
- Conservation banks can provide developers with immediate access to credits thus reducing the time required to find the offset for the project.

On the other hand there can be increased risks associated with conservation banks including:

- With a number of offsets at the same location the effect of a natural disaster or other failure of the bank site is magnified;
- Pressure on the offsetting policy manager to relax the 'rules' to increase the commercial viability of the banks.

3. Possible roles of government in establishing and administering policy on biodiversity offsets (for each, describe briefly what it entails)

3.1 Policy-maker/regulator

Making policy and regulating are functions unique to government. The development and implementation of biodiversity offset policy or regulations depend on government action. The broad options for biodiversity offsets policy are discussed in section 2.2.

Different governments use different processes for making policy. In considering the process to be used for the development of policy on biodiversity offsets, the BBOP principles outlined above can be helpful, in particular the following that relate to process:

- stakeholder participation;
- equity – consider how risks and rewards can be distributed in a fair and balanced way;
- transparency; and
- science and traditional knowledge –policy informed by scientific knowledge and taking appropriate account of traditional knowledge.

Biodiversity offsets policy is often developed in the context of a broader biodiversity conservation policy. There can be connections between offsetting and other approaches to biodiversity conservation policy such as a protected area system, land use planning and investments in conservation gain. There are also technical links such as common information systems and metrics.

Policy making usually entails the development of policy options, consultation with stakeholders, assessment of options and finalisation of preferred positions. Governments can make formal commitment to final policy through proclamation or legislation.

Plans and adequate arrangements for the implementation of policy are critical to success. As biodiversity offsetting can be a new area of policy, it is prudent to build in a process for monitoring and review so that refinements can be made over time.

3.2 Provider, curator and source of authoritative biodiversity information

Government agencies commonly collect data about biodiversity and natural resources. These data may relate to general biodiversity information such as vegetation cover and type or to more specific aspects such as species occurrence and habitat characteristics. Over time governments often build up significant collection of biodiversity information.

Protocols for the collection, quality assurance and safe storage of these data can be valuable to ensure that authoritative information is available for application to biodiversity offsetting. These systems should also enable other (non-government) organisations to contribute data to the national databases.

Biodiversity information needs to be analysed and modelled in specific ways to create the tools necessary for the implementation of biodiversity offsets policy. This could be, for example, the delineation of bioregions or ecosystems, the classification of vegetation types by significance, systematic conservation planning to determine the optimum configuration in the landscape of a network of areas to conserve biodiversity, or the spatial variation of habitat quality.

Private consultants and companies often play important functions in biodiversity offsetting processes, through for example the assessment of impacts and the identification and evaluation of potential offset areas. Access to the relevant government biodiversity information and tools is very important for the participation of the private sector.

3.3 Buyer of offsets

Regulations for biodiversity offsets should naturally apply to the government itself. Governments are often responsible for activities such as road building, water supply and other public infrastructure projects and where have biodiversity impacts within the scope of the policy or regulation, it will be necessary for the government, or the government agency, to provide offsets.

In these situations the government could provide offsets by creating credits on public land or government-owned freehold land (see below), or more commonly, acquire a third party offset.

3.4 Seller of offsets

Biodiversity gain can be created by transferring freehold land into publically owned protected areas, or by elevating the level of protection of existing areas of public land. As discussed in section 2.1, two types of gain can be generated by these interventions: gain from the change of the use of the land and gain from the increased security of the biodiversity associated with the land.

Governments make decisions from time to time to create protected areas (and generate gain) within the context of broader biodiversity conservation policy. The principle of additionality - requires the conservation outcomes the biodiversity offset delivers to be demonstrably new and additional and not to have resulted without the offset. This principle is relevant when governments are considering whether or not the gain generated from new protected areas (or improvements to existing protected areas) can be considered as biodiversity credits that can be used for offsets.

The additionality principle indicates that the creation or expansion of protected areas as part of a conservation reserve programme and for general biodiversity conservation purposes should not result in biodiversity credits or be used for biodiversity offsets if government should undertake the work as a matter of public duty. However, credits and offsets can result from the establishment or improvement of protected areas where the following conditions apply:

- The creation of the protected area is over and above existing plans and programs for protected area establishment;
- At the time of its establishment the purpose of the protected area is specifically nominated by the government to be for offsetting.
- The decision to create the protected area is linked to nominated current or future developments requiring offsets.
- The improvement of a protected area is specifically for the purpose of offsetting a loss within the protected area.

Subject to these conditions, a government could create credits from new protected areas and sell them to parties requiring offsets.

Where an offset market exists, governments need to consider fair competition principles when they enter the market as a seller. Governments can have inherent cost advantages (such as those relating to taxation) that should be mitigated so that government-owned credits do not unfairly compete with privately owned credits in the offsets market.

3.5 Broker

In offset markets, brokers perform the role of intermediaries between buyers and sellers. Brokers can be particularly useful for arranging bespoke trades where potential suppliers of specific credit types have to be individually identified and brought into the market. In contrast, owners of conservation banks often sell credits directly to buyers, without the intervention of brokers. Brokers can also be a source of advice and expertise to inexperienced and infrequent buyers and sellers who may lack the confidence to deal directly in the offset market.

The brokering role is usually one for the private sector, but there can be circumstances where a government may chose to provide a broker service. This could be, for example, in the start up period of an offset market when there is uncertainty about the functioning and likely strength of the market; or in areas where the market may be too thin to support private commercial brokers.

Where there are commercial brokers operating in the market, a government broker should operate on a full cost pricing basis in order to maintain fair competition.

3.6 Operator of register of credits, standard setting

Credit registers record and track ownership information of biodiversity credits and provide quality assurance through the credit registration process.

The establishment and operation of credit registers is a natural function for government. Credit registers can be set up formally through legislation or administratively through a government agency.

As biodiversity credits are traded they have the characteristics of property, whether this is formalised through legislation or not. Thus it is very important that the credit register is established with a high level of accountability and attention to detail. Credit registers need to be kept up to date, accurate and authoritative. There should be formal rules for the operations of the register including registration, changes of ownership and cancellation.

The initial recording of a biodiversity credit on the register provides the opportunity for implementing the standards set for offsets. These are the standards such as for site assessment, management plans and gain calculations that are set for offsets through documents complementary to the offsets policy. Biodiversity credits need to be fit for the purpose of being biodiversity offsets and acceptance of credits onto the register provides the process for checking this requirement.

3.7 Provider of process to ensure permanence of offsets

Biodiversity offsets need to be permanent where the associated losses are permanent. Permanence is not about making an eternal guarantee about an offset, but rather arranging for a permanent institution to make a binding commitment to the ongoing responsibility to maintain the offset. In many jurisdictions, the relevant permanent institutions are landowners (for freehold land) and government. That is, it is assumed that there will always be an owner of freehold land and that there will always be a government.

Government has a role in arranging permanence for offsets on both freehold and public` land. The establishment of third party offsets on freehold land involves some form of statutory agreement with the current landowner. Permanence requires that future landowners are also bound by this agreement. This is usually achieved by attaching the agreement to the land title along with a legal requirement that future owners are bound by the agreement. Government action is required to establish these mechanisms in law and in being a party to the individual agreements.

On public land, offsets usually require some elevation of the level of protection (security) of the subject land, for example through the proclamation of a conservation reserve or a national park. These decisions are taken by government and are usually implemented through legislation.

In countries where different forms of tenure prevail (such as leasehold or community ownership), other approaches to ensuring long-term security need to be considered. The form of these approaches will be strongly dependent on the country's legal framework.

3.8 Monitor and enforcer

Governments' role in monitoring the integrity of biodiversity offsets and managing compliance issues depends on the nature of the offset. For offsets provided directly by the developer (first party offsets) there will usually be provisions in the development approval instrument (i.e. the permit or consent often arising from an EIA) for a government agency to monitor the offset site and initiate a series of compliance procedures if certain specified actions are not implemented, or certain specified targets are not met.

Where the offset has been provided through an offset market (a third party offset) the developer is relieved of responsibility for establishing and managing the offset when the permitting authority accepts the biodiversity credits (purchased by the developer) as a complying offset. The credit supplier takes on responsibility for the offset, and monitoring and compliance is focused on the credit supplier rather than the developer. As described above, the government will have monitoring and compliance responsibilities through the provisions of the statutory agreement with the credit supplying landowner.

Within government, the agency responsible for granting the development approval that requires the offset is ultimately responsible for monitoring the ongoing integrity of the offset. However, another government agency may be responsible for the agreement with the landowner for delivering the biodiversity credits, including the monitoring and compliance provisions in the agreement between government and the landowner (or other entity generating the credit through agreed conservation activities). In this situation there should be some form of understanding between these agencies regarding reporting and action on monitoring information and compliance actions.

3.9 Identifying and managing conflicts of interest between these roles (probity)

Given the various roles for government in biodiversity offsetting that have been explored above, it is clear that there is potential for conflicts of interest. Examples of potential conflicts of interest include:

- The government as a developer of infrastructure projects and as the regulator specifying and enforcing requirements for biodiversity offsets;
- The government as operator of the biodiversity credit register and as a supplier of offsets seeking registration of its credits on the register;
- The government as monitoring and enforcement agency and as a supplier of offsets managing and maintaining credit sites.

These potential conflicts of interest do not necessarily mean that governments cannot undertake a variety of roles relating to biodiversity offsets. However they do mean that potential conflicts need to be identified and arrangements put in place to manage and resolve conflicts as they arise. This process is referred to as probity. Probity is a feature of the design and implementation of an offset system by government that is concerned with integrity in process and ensuring that all parties are treated with fairness and equity, in a system with good governance.

Probity involves an examination of the processes involved in the various roles, describing and separating responsibilities and identifying issues including conflicts of interest, confidentiality, information handling and decision-making. Usually a probity plan is prepared by an independent probity adviser that sets out in advance how these issues will be handled. Measures included in probity plans include the clear separation of decision making, secure arrangements for handling information and formal declarations of personal conflicts of interest. The independent probity adviser will generally review operations from time to time and provide a report to the various parties on compliance with the probity principles and the other provisions of the probity plan.

3.10 Creating the market

Market-based instruments offer policy makers a number of benefits, in terms of effectiveness and efficiency, and markets in biodiversity credits are no exception. However, markets of any kinds are dogged by market failures, and markets related to biodiversity are particularly controversial, given the public and open access nature of biodiversity and ecosystem services. With biodiversity, market failures are typically caused by the existence of externalities, imperfect information, and the non-excludability or non-rivalry of biodiversity's

goods and services[19]. Any market-based approach to biodiversity offsets will thus need to be developed with great care.

The key actions for government to set up a credit market are to:

- **Establish the units of trade:** Define the units of trade (credits), the metrics for their measurement and the processes by which they will be measured in the field. Establishing credits as property through legislation can also be beneficial.
- **Set up a credit register:** The register provides certainty to the market about the quality of the credits and about the ownership of credits.
- **Facilitate the establishment of marketplaces:** Assist buyers and sellers of credits to find each other by encouraging and accrediting brokers, over the counter facilities and conservation banks. In some circumstances, the government may establish a state-operated broker.
- **Identify and deal with risk for buyers, sellers and the environment:** The parties in the market need a reasonable level of confidence in order to participate. Buyers need confidence that the credits they buy will be accepted as offsets. Sellers need confidence that if they make commitments to establish supply, there will be some demand for their products. The flexibility built into the market should not always be at the expense of the environmental outcome.
- **Consider customer service, competition and efficiency in the market design:** The market design needs to be responsive to the needs of customers (e.g. developers can procure their offsets in reasonable time). Facilitating competition and avoiding monopoly supply helps achieve fair prices. Efficiency should also be built into the market design, for example by making credits divisible so that buyers can buy just the number they require.

4 What kind of capacity does government need to take on biodiversity offset policy?

4.1 Costs and cost recovery

Government and private sector roles

An initial consideration of the requirement for government capacity is the relative role of government and the private sector, particularly in the implementation of biodiversity offset policy. In jurisdictions where much of the implementation is undertaken by the private sector through markets, the need for government capacity and resources will be significantly reduced.

However, the task of policy development (and regulation where this is adopted) does fall to government. Costs can be considered in two main parts –the development of policy and the operation of the offset scheme. The main sources of cost in the policy development process are:

- Policy development and preparation of guidelines
- Regulation making (may require new legislation and amendments to existing legislation)
- Preparation of standard forms and procedures (and their documentation with accompanying guidance in manuals)
- Biodiversity information systems (collection, storage, analysis). This usually builds on existing information and systems.

The main sources of cost in the operation of the offset policy are:

[19] OECD, 2004.

- The assessment of individual development proposals, usually using existing processes
- The specification of offsets based on like for like criteria and loss gain metrics
- A case management system that documents the flow of applications through the process
- Monitoring and compliance of offset sites
- Communications (websites, information sheets, brochures)

In a regulated context where offsets are supplied through a credit market, governments may be involved in establishing and operating the credit register. The main sources of cost in this situation are:

- Establishment of a credit register through legislation
- Establishment of credit property rights (legislation for credits as property)
- Operation of the register and implementation of trading rules
- Development of guidelines for various trading mechanisms including 'over the counter' and electronic trading

In some circumstances, a government may offer a broker service for suppliers of credits and buyers. This option could be adopted as a transitional measure at the start up of an offset scheme where there is much market uncertainty and the private sector is reluctant to establish broker services. The main sources of cost for brokers are:

- Recruitment of suppliers including site assessment, preparation of management plans and calculation of biodiversity gains
- Receiving enquiries for offsets from developers and matching these to supply
- Managing databases of buyers and suppliers
- Facilitating transactions between buyers and sellers through negotiation or bidding
- Arranging and executing contracts of sale
- Managing contracts for site management and reporting to compliance authorities

Governments will usually be the only institutions that can make legal arrangements for the permanent security of offset sites, where this is required. These arrangements include on-title agreements, private land surrender and inclusion into a public conservation reserve and the creation of protected areas on private land or by the reclassification of the status of public land. These processes will usually already exist in the jurisdiction and the costs will be known from previous experience.

The costs associated with these various processes and services will vary from country to country and need to be estimated on a case-by-case basis. However, experience in jurisdictions that have already established policies and offset schemes of varying design and complexity has demonstrated that these are not trivial tasks. It can be anticipated that it would take several years and the input of a variety of expertise (see below) to develop a policy and establish an operating scheme.

Cost recovery

While there are many costs to be considered as identified above, a government could recover these costs in part or in full. This is done by charging fees for the services provided to the users of the offset scheme. Cost recovery may be particularly appropriate where credit markets are established for the supply of biodiversity offsets. Not only does this ease the burden on the public purse, it also leads to the incorporation of more of the transaction costs into the price of offsets which results in more economically optimal outcomes.

It may be less appropriate to implement full cost recovery for services associated with tasks such as policy development, legislation and policy implementation where these are considered normal functions of government.

Cost recovery usually involves the following steps:

- Define the services to be provided and allocate inputs (labour and other costs) to each service
- Estimate the service levels: that is the numbers of various services provided over each time period
- Set the cost of services (the fees) to achieve partial or full cost recovery
- Consider which parties will pay the fees and when the fees will be collected. It may be advantageous to delay the collection of some fees (for example, associated with credit creation) until the time of credit sales.

Where a government and the private sector are both offering the same services to the market, any requirements of government competition policy will need to be taken into account.

4.2 Skills and capacity

The development and implementation of biodiversity offset policy spans a wide range of professional and technical skills. Box 6 identifies the main skills and inputs required for the four main segments of the framework.

Box 6: Skills and capacities for biodiversity offsets				
Framework segment	**Policy/regulation**	**Credit register**	**Credit market**	**Offset security**
Skills and capacity	Biodiversity policy	legal	legal	legal
	Biodiversity science (including spatial information and modelling	Information technology	economic	Protected area planning
	Information technology		brokers	
	Field assessors		Offset analysts	
	Land use planning, EIA			

4.3 Staffing levels

Dependent on case load, complexity of system

Staffing levels depend on the number and complexity of the offset scheme. The most labour intensive area of work can be associated with the assessment of biodiversity losses and gains, where this involves field work. Increased use of mapped and modelled biodiversity information can reduce the need for intensive field work.

Staffing levels need to be considered in the context of the size of the offset transaction. Staff costs are part of transaction costs that are usually intended to be a relatively modest proportion of the overall cost of the offset. A scheme with a high price transaction (e.g. $1 million) may require and be able to support higher staffing levels than one with smaller transactions (e.g. $10,000). The design of the scheme would take this into account.

5 Lessons learned to date and some suggested ways forward for governments interested in exploring biodiversity offset policy options

5.1 Lessons learned

This section sets out some of the lessons that have been learnt from the experience in various countries from designing and operating biodiversity offsets policy and programmes. This is not intended to be a complete 'how to do it' catalogue, but rather as a guide to some starting points when considering an offsets policy. The main lessons are:

- If the objective is to achieve a comprehensive biodiversity offsets, then regulation to require offsetting will be required. In the absence of regulation, only a minority of companies are likely to see a business case for voluntary offsets.
- Any policy and legislation on biodiversity offsets need to be clear and definitive about the circumstances in which offsets are required, the explicit outcomes desired, and the rules by which the offsets will be specified and measured (i.e. what criteria and indicators).
- Biodiversity offsets policy should be based on sound principles. In considering the development of policy on biodiversity offsets, the BBOP principles outlined should be considered.
- Keep the rules as simple as possible. Specify the basics necessary to achieve the biodiversity conservation objectives but allow sufficient flexibility for the scheme to provide offsets for developers in an economical and timely manner. Where there are overlapping jurisdictions (e.g. in federal systems) or overlapping policies, seek to have only one offsets scheme or, if this is not possible, arrange accreditation between levels of jurisdiction so the offsets can be arranged through a single process.
- Offer guidance and examples through clear and authoritative publications so people know what to do, and what to expect from the system in terms of cost, time and support.
- If the system uses biodiversity credits, create legal certainty around the property rights of credits and the security of offset sites to enable people to make investments.
- A biodiversity offsets policy requires biodiversity data and mapping as basis for implementation. A scheme can be put into operation with a relatively limited biodiversity information base and a simple loss and gain assessment method. However, the design of the processes should attempt to take into account the uncertainties created by the limitations of information and methods to avoid unintended losses of biodiversity.
- Adequate monitoring and compliance with offset requirements is critical to success. Past failures have often been associated with lack of monitoring and enforcement of EIA or offset requirements.
- Adaptive learning, based on the monitoring above, is recommended to help policy design and implementation evolve based on experience.

5.2 Suggested ways forward for governments interested in exploring biodiversity offset policy options

The decision to introduce a policy on biodiversity offsets is a significant step on the road to sustainable development and biodiversity conservation. It is natural that, prior to any commitment, governments will undertake a substantial body of background work that could include information gathering, cost benefit analysis, pilot projects and the development of policy options. The nature of these tasks is outlined below.

- **Fact-finding and gap analysis - policy:** Generally speaking, governments already have in place a range of law and policy that is relevant to biodiversity offsets (see section 2.1). A first step is thus to undertake an analysis of existing relevant policy at the national or regional levels (e.g. EIA, conservation law including protected area legislation, planning regulations, sectoral policies, fiscal policies, liability regimes, land tenure, indigenous peoples' rights, strategic environmental assessments, land use plans and so on) to explore the extent to which these serve to require, facilitate or even present a barrier to undertaking high quality biodiversity offsets.

- **Fact-finding and gap analysis – biodiversity data:** A certain depth, quality and consistency of biodiversity data is needed in order to assess projects' impacts on biodiversity, to plan appropriate biodiversity offsets and certainly to establish a regional or national system of biodiversity offsets. Most countries have at their disposal quite a volume of habitat and species data, in a range of data sets of varying quality and scope, held by government, NGOs, academic organisations and even companies, some up to date and some old. A gap analysis of existing biodiversity data and maps is thus a wise first step. Data is needed for offset planning to support the classification of habitat types (and condition of such habitat), application of 'like-for-like-or-better' approach, site selection and potential designation of credit types, if aggregated offsets or conservation banking is considered an appropriate approach.

- **Fact-finding– cost-benefit analysis:** In some circumstances it may be useful to undertake a socioeconomic cost/benefit analysis of introducing no net loss policies. In particular such an analysis could consider the benefits and costs to the economy, where the benefits could include environmental benefits as well as the economic benefits of sectors that might expand, such as tourism and conservation restoration. A regional impact analysis could also consider local employment effects.

- **Pilot projects:** Practical experience with designing offsets for individual projects can help governments decide what nature and content of biodiversity offset policy would be appropriate for the country concerned. Practical experience of biodiversity offset design that can inform the development of national policy on the topic. Governments could work with potential pilot project partners to agree a description of what is entailed in a pilot project, as the basis for discussion with potential pilot project partners, then establish a Memorandum of Understanding for collaboration on a pilot project with the companies concerned. The government can form a Working Group (comprising local experts and perhaps one or two international experts with experience of offset design and implementation) to support the companies concerned in the design of biodiversity offsets for their pilot projects.

- **Integrating biodiversity offsets with land-use planning at the national or regional levels:** Governments could examine whether any regional land use-plans or strategic environmental assessments are planned, and integrated biodiversity offset planning into these. Regional land-use and biodiversity offset planning relies on the integration of biodiversity data and data layers concerning the location and nature of development plans (e.g. mines, linear infrastructure, town expansion etc).These will be brought together to serve as the basis for regional land-use and aggregated offset planning.

- **Identify, analyse and evaluate policy options:** The results of the fact-finding and of the empirical work on individual pilot projects and integrating biodiversity offsets with land-use planning at the national or regional levels described above can allow government to identify the full set of policy options. These could range from 'business as usual' (no additional policy needed: offsets will be planned according to companies' and lenders' business case for undertaking them voluntarily) to 'conservation banking' (requirements for offsets that developers can choose to meet by purchasing the correct number and type of 'biodiversity credits'). The options could include a number of other voluntary and regulatory models. In each case, the respective advantages and disadvantages of the option can be articulated, as the basis for discussion, together with a description of the legal, financial and human resources needed for the government to implement each option. Consultation with stakeholders will be important throughout.

- **Policy formulation and system design:** Once the government's preferred approach(es) are ascertained during the policy evaluation stage above, government will need to draft any policy measures needed to give effect to the preferred option, and undertake further work to design the system (e.g. exchange rules, mapping, and any system of conservation credits) needed to implement the particular policy option. Again, consultation with stakeholders will be important throughout.

- **Implementation of policy, monitor and review**.

6 Interested in learning more?

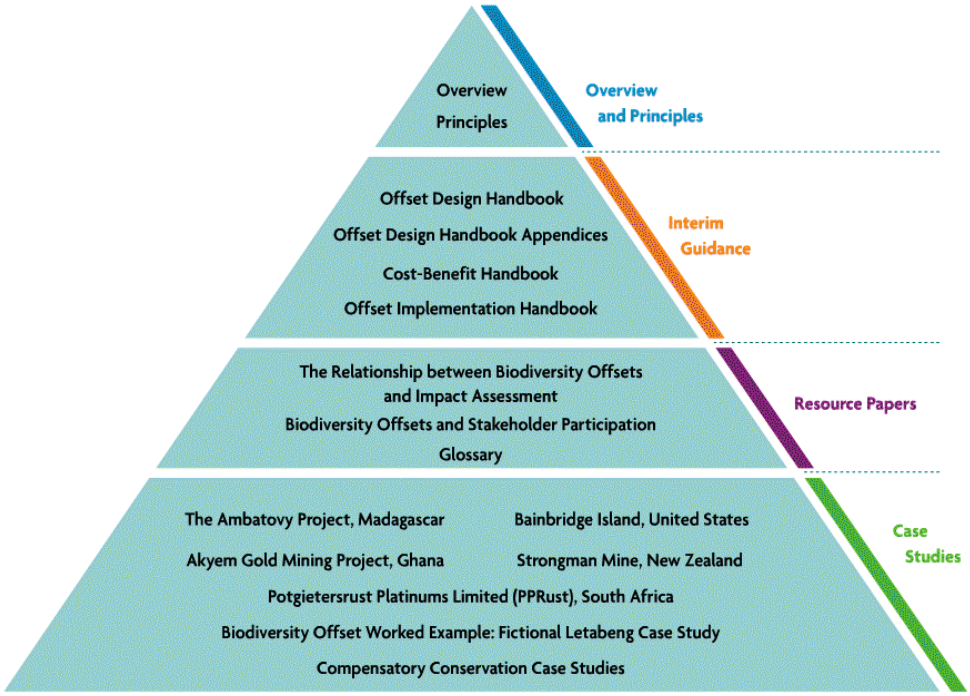
This paper was prepared by the authors as a contribution to the Business and Biodiversity Offsets Programme (BBOP).

Over the last six years, the Business and Biodiversity Offsets Programme (BBOP), now a partnership of over 50 leading organisations and individuals including companies, governments, conservation experts and financial institutions from around the world[20], has been exploring biodiversity offsets. The member organisations comprise the BBOP Advisory Group, and are served by a Secretariat comprising two NGOs: Forest Trends, which started BBOP, and the Wildlife Conservation Society.

Responding to the decisions by the Parties to the Convention on Biological Diversity at their ninth meeting (CBD COP9) and other requests for work of this kind, the BBOP partners worked hard to reach agreement on fundamental issues relating to biodiversity offsets, and to develop practical guidelines for offset design and implementation. Chief among BBOP's products to date is a set of ten fundamental principles (see Box 3 on page 14) agreed and supported by BBOP members and increasingly adopted and used by other companies, governments and civil society as a sound basis for ensuring high quality biodiversity offsets. In addition, BBOP completed a methodology toolkit in May 2009 which includes three core handbooks on offset design and implementation; resource papers on how biodiversity offsets relate to impact assessment and stakeholder participation. It also contains case studies of the BBOP oil and gas and mining pilot projects and other offset and compensatory conservation experiences; and supporting material such as a glossary of technical terms. All of this material is available on the website: http://bbop.forest-trends.org/guidelines and a CD-Rom. See Box 7.

[17] For the full list of BBOP Advisory Group members, please see: http://bbop.forest-trends.org/documents/BBOP%20Advisory%20Group%20Members.pdf

Box 7: BBOP publications, May 2009



See http://bbop.forest-trends.org/guidelines/index.php

Following the first phase of BBOP's work (November 2004 – June 2009), the programme is now scaling up during its second phase (July 2009 – July 2012), and looking ahead to a third phase.

The BBOP Executive Committee (which sets the group's strategy and is elected from its Advisory Group members) has established six priorities in the period to July 2012:

- **Standards on biodiversity offsets** – developing internationally agreed and certifiable standards for biodiversity offsets. Starting with agreed protocols for verification and auditing of biodiversity offsets, tested at pilot sites, a draft standard on biodiversity offsets will be made available by July 2012. Subsequent versions with improved indicators and guidance notes based on experience from using the draft will be issued during BBOP's next phase, which will run to July 2015.
- **A broader portfolio of biodiversity offset experiences** – demonstrating through BBOP pilot projects and others' experiences how biodiversity offsets could work in a broad range of countries and industry sectors.
- **National level interventions** – providing technical support and policy advice on biodiversity offsets, landscape-level and regional planning to governments, through general reports and specific advice.
- **Better guidelines** – improving the BBOP guidelines on how to design and implement biodiversity offsets, based on broader geographic and sectoral experience of BBOP members and others.
- **Training and capacity building** – training a cadre of professionals worldwide to support companies and governments in the design and implementation of biodiversity offsets and associated regulation and policy.
- **Improved Communications / Global Forum** – providing a range of communications products emanating from the work streams above and serving as a global learning forum on biodiversity offsets

BBOP's broad membership offers a tremendous wealth of expertise, experience and technical assistance on biodiversity offsets from all around the world.

BBOP would be glad to hear from and ready to welcome new members interested in joining the Advisory Group or the Learning Network. For further information, please contact: **bbop@forest-trends.org .**

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LATIN AMERICAN WATER FUNDS PARTNERSHIP

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FUNDACIÓN FEMSA

IDB
Water and Sanitation Initiative

GLOBAL ENVIRONMENT FACILITY
20 YEARS
INVESTING IN OUR PLANET

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WATER:
A source of life in Latin America

Water is life: for plants, animals, rural and urban communities, industries, farming, our families and future generations. Rivers and lakes are the most important source of water for our everyday life, for our economies and for the wellbeing of all. Yet worldwide nature's ability to provide the clean water that is crucial for our lives and our economic development is diminishing.

Our forests and grasslands filter, clean and keep the water flow levels steady. As they become degraded or destroyed, our water supplies become severely threatened. Lakes and rivers are exposed to sediments and pollution that make millions of people vulnerable. Climate change and other factors only make this a bigger challenge.

According to the United Nations, more than two-thirds of the world's population will face water scarcity by 2025. In Latin America, more than 77 million people lack access to clean water. Development in our countries depends on water and as our supplies become strained or polluted, industries, communities and governments must often pay higher costs for it.

Protecting freshwater sources in Latin America is vital. To achieve this we must preserve nature, as we expand green development opportunities for millions of people in our cities.

WATER FUNDS:
Investing in nature for people

Water Funds are about both people and nature thriving, and about working together to put our communities and our economies on track for a healthier future.

A Water Fund is an innovative way to pay for nature's services and reinvest that money in conservation. Since a healthy watershed minimizes water treatment costs, the funds attract voluntary contributions from large water users downstream, like water utilities, hydroelectric companies, or industries. Revenue from these investments is directed to preserve key lands upstream that filter and regulate the water supply, as well as to create incentives for sustainable economic opportunities that have a positive impact on local communities.

A common vision for Latin America and the future of water

The Nature Conservancy, FEMSA Foundation, Inter-American Development Bank (IDB), and Global Environment Facility (GEF), unite to create the **Latin American Water Funds Partnership**, sharing a common vision for the future: to preserve healthy watersheds and help protect important water supplies in the region.

With environmental conservation and sustainable growth as its core values, the Partnership is a ground-breaking initiative to engage the private and public sectors and civil society on Water Funds.

The Latin American Water Funds Partnership comprises investments of **over $27 million dollars** that will create, implement, and capitalize at least **32 Water Funds** in Ecuador, Colombia, Peru, Brazil, Mexico and other countries in Latin America and the Caribbean. This will support the conservation of more than **7 million acres** of watersheds that, in turn, could benefit approximately **50 million people** in rural and urban areas.

HOW WATER FUNDS WORK

They are based on **science**. Scientific information guides conservation and environmental services restoration goals and identifies areas in the watershed where investments will have the highest return. They use monitoring systems to report progress on the goals to all stakeholders.

They are **inclusive**. As important sectors of society become involved, there is a successful interaction between scientific knowledge, financial expertise and sustainable public policies in the implementation of the funds. This also helps to make each Water Fund **transparent**.

They are **comprehensive.** Joint efforts promote public awareness about the importance of conservation, while encouraging green-economy solutions that benefit all.

They are **self-sustaining**. Each fund creates its own resources through a perpetual trust aimed at critical watersheds conservation.

Above all, they are **effective**. The watersheds are protected, along with habitats for native plants and wildlife. And this translates into a better water supply for everyone and for the future.

Another primary goal of the Partnership is that more and more actors in the **various sectors recognize the benefits of Water Funds for nature and people**, so that these sectors can also commit to working in favor of water and watersheds in Latin America.

SUCCESS IS ALREADY A REALITY

In 2000, The Nature Conservancy joined with other local partners in the public and private sectors to create the first Water Fund in Quito, Ecuador. The project started with an investment of $21,000 dollars and grew to $10 million dollars in just a decade. Interest generated by the fund –around $900,000 dollars per year– is successfully invested in local conservation actions to protect watersheds and biodiversity. Today, five Water Funds in Ecuador have helped protect more than 1.2 million acres and benefited more than 2 million water users downstream.

In Colombia, two Water Funds, in Bogota and Valle del Cauca, have been successful in raising environmental awareness and have financed community conservation projects, such as reforestation, ecotourism, and monitoring the quality of water and its flows. Today these projects help to protect almost half a million acres.

LATIN AMERICAN WATER FUNDS PARTNERSHIP

The Nature Conservancy - www.nature.org
FEMSA Foundation - www.femsafoundation.org
Inter-American Development Bank - www.iadb.org
Global Environment Facility - www.thegef.org

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IDB
Water and Sanitation Initiative

GLOBAL ENVIRONMENT FACILITY
20 YEARS
INVESTING IN OUR PLANET

Latin American Water Funds Partnership
Top-line Points

- **The Latin American Water Funds Partnership invests more than USD27 million** in creating, implementing and capitalizing at least 32 Water Funds in Latin America (Ecuador, Colombia, Peru, Brazil, Mexico and other places in Latin America and the Caribbean). **These projects will support the conservation of more than 7 million acres of watersheds that, in turn, have the potential to benefit approximately 50 million people**.

- This Partnership firmly establishes FEMSA and IDB as regional leaders on clean water issues. **Their investment will send a strong signal to other large corporations and funders** that Water Funds are a smart way to protect water supplies.

- **Each organization adds unique value** to strengthen the partnership:
    - **TNC:** On-the ground experience with Water Funds, field and regional implementation with local stakeholders, monitoring and reporting.
    - **IDB:** Value to its clients by helping them to develop Water Funds that will bring about improved water security for their day-to-day operations; provide leadership to the international financial community by further testing and mainstreaming this concept into its loan operations; clients would thus reduce their operational risks and improve their efficiency while leveraging social and environmentally-responsible projects undertaken in the watersheds.
    - **FEMSA:** Corporate vision to Water Funds; public and private connections with water users in Latin America and the world.
    - **GEF:** Innovative financing through its Earth Fund, which leverages the private sector to support globally important biodiversity conservation efforts.

- Water Funds give businesses, governments and individuals a **powerful new way to influence and drive the conservation of natural lands** that provide their water.

- Our role at the Conservancy is to help **bring people from all sectors of society together and innovate tools that protect water and natural resources** we all depend on. **We provide science-guided counsel** to help ensure that funds are directed toward the most important places and activities that will yield the best return on investment.

- The fact that investments to capitalize the funds are **primarily coming from within Latin America** proves that public and private sector leaders in the region are taking the role of nature seriously when it comes to water.

- Private companies and local utilities are investing in the Water Funds because they've done the financial math and seen that they are **cost-effective mechanisms to ensure the water quality and water quantity** they need for the products and services they provide their customers.

- **Providing clean water for people requires a smart mix of green and gray infrastructure –**healthy rivers as well as pipes and water processing facilities.

    - Protecting natural lands that provide water helps keep the need for costly gray infrastructure down. At the same time, **green infrastructure provides a broader array of benefits for people, particularly the rural poor** who are heavily dependent on natural resources for their livelihoods.
    - **Water Funds are a tool that makes a "green and gray" hybrid approach a viable option for decision-makers.**

- **Water Funds exemplify the "green economy"** concept – societies must develop in ways that yield both environmental and *equitable* economic benefits.

- There are **two distinct Water Fund models in operation in Latin America**; the concepts and goals are the same, the sources and flows of money are a bit different:

- **The Water Funds operating in Ecuador, Colombia and Peru work like an endowment.** Voluntary investments are gathered into a central fund and invested. Earnings are disbursed toward direct conservation action, such as reforestation, and toward easing land conversion pressure by helping rural people start small businesses. A board is created to oversee each Water Fund. The board is made up of representatives of investors, local communities, public sector, and water companies, **giving all stakeholders a seat at the table**.

- **Water Funds in Brazil funnel direct monthly "payments for ecosystem services" to private landowners** who take concrete action to protect waterways on their land, such as fencing cattle out of streams. The funds come through municipal agencies, with the private sector beginning to contribute as well.

- **In Brazil, new Water Funds will likely follow the Brazil model**, but there is the discussion to include endowment to allow for long term conservation easements and agreements. **In other parts of Latin America and Caribbean, they will follow the Andean model**.

- **The endowment model has already been exported to the United States.** The Conservancy worked with partners in Santa Fe, New Mexico, to establish a Water Fund that gathers small fees from water users and directs the funds towards controlled burns in the watershed. This reduces the chance of large wildfires that can fill reservoirs with ash and sediment following big rains, and would cost millions to clean up.

- **We look forward to the upcoming Rio+20 Earth Summit,** just one year away, as an opportunity to scale up this innovative tool.

CAUTIONS

- **The Water Funds partnership is not an initiative to privatize water management**. The Partnership does not address topics such as fees, privatization, and invoice increases, because they are the exclusive responsibility of each country's authorities, policies and regulations.

- **Contributions to Water Funds do not automatically mean direct increases in water fees for users**. It usually evolves as voluntary payments by water users. The governments and societies can decide that the price of water should include the cost of conservation.

- **Water Funds contribute to poverty alleviation but are not a poverty alleviation strateg**y as most within the development community would technically define it. The number of jobs created through the Water Funds is actually quite low at this time (a couple hundred), so we generally do not reference the number.

- **One of the big remaining challenges for the Water Funds model in the Northern Andes is conditionality**. If people in the watershed stop following conservation measures, we have no way to revoke the financial benefits they have received through Water Funds. If asked about this, you can confidently say that we're setting up conservation measures protocols with local stakeholders.

- **The Water Funds are reducing threats to waterways that provide a variable percentage of the water supplies for each city, but not all of the water sources**, so be cautious enough in your wording to not oversell. Recommended verbiage: "Protects sources of water for…"

- **Determining the value of avoided environmental damage to freshwater is challenging and requires baseline or control data that is difficult to get. This is a long process and Conservancy scientists are committed to getting it right**. Bottom line: there is a vast body of science that connects degradation of nature with dirtier water and increased flooding and low water levels.

No.	Water Fund WF Name	Country	Conservation Program	Status of WF		
				Idea	Feasibility	Created
1	Agua por la Vida y la Sostenibilidad (East Cauca Valley)	Colombia	Nasca			■
2	*Cartagena*	Colombia	Nasca		■	
3	*Medellin*	Colombia	Nasca		■	
4	*Bogota Agua Somos*	Colombia	Nasca		■	
5	Sierra Nevada de Santa Marta, *Santa Marta*	Colombia	Nasca	■		
6	FONAG, *Quito*	Ecuador	Nasca			
7	FONAPA, *CuencaPaute*	Ecuador	Nasca			■
8	Tungurahua/ *Ambato*	Ecuador	Nasca			■
9	Azogues	Ecuador	Nasca			■
10	Zamora	Ecuador	Nasca			■
11	Ayampe, *Puerto López*	Ecuador	Nasca		■	
12	Merida	Venezuela	Nasca	■		
13	Sixaola River	Panama	Nasca	■		
14	Sao Paulo	Brasil	AFSC			■
15	Rio de Janeiro	Brasil	AFSC			■
16	Balneario Cambari	Brasil	AFSC			■
17	Palmas	Brasil	AFSC	■		
18	Guaratingueta	Brasil	AFSC	■		
19	Brasilia	Brasil	AFSC	■		
20	Patrocinio	Brasil	AFSC	■		
21	Espiritu Santo and Espiritu Santo States	Brasil	AFSC			■
22	La Tigra, *Tegucigalpa*	Honduras	MNCA	■		
23	*Ciudad de Guatemala*	Guatemala	MNCA	■		
24	Rivera Maya-Cancún	Mexico	MNCA		■	
25	*Monterrey*	Mexico	MNCA		■	
26	Cutzamala-Toluca	Mexico	MNCA	■		
27	Aquafondo, *Lima*	Perú	SA		■	
28	Arequipa	Perú	SA	■		
29	La Paz	Bolivia	SA	■		
				12	**7**	**9**

	Population
Consolidated	Beneficiaries
	283,000
	1,239,000
	3,729,000
	9,600,000
	415,000
	2,300,000
	467,000
	354,000
	27,866
	10,300
	16,000
	630,000
	10,000
	9,000,000
	8,000,000
	450,000
	175,000
	100,000
	350,000
	70,000
	300,000
	700,000
	1,100,000
	562,000
	4,000,000
	1,610,000
	9,100,000
	1,200,000
	2,300,000
1	**58,098,166.00**

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Compensaciones por pérdida de biodiversidad y su aplicación al caso piloto de Minería de Carbón en el Cesar

Shirley Saenz M.

The Nature Conservancy

- Organización ambiental mundial fundada en USA en 1951.
- Trabajamos en 32 países.
- Hemos protegido más de 50 millones de hectáreas de tierras y 8,000 kilómetros de ríos alrededor del mundo además de implementar más de 100 proyectos de conservación marina.
- Tenemos más de 1 millón de miembros.
- Basada en Ciencia. No confrontacional.

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Antecedentes

- Alianza Interinstitucional 2008 – 2010 MAVDT, TNC, WWF y CI.
- Propuesta de metodología para valoración y asignación de compensaciones por pérdida de biodiversidad.
- Aplicar la propuesta al caso piloto de minería de carbón en el departamento del Cesar.

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Experiencias internacionales vs. Experiencias nacionales

Elementos en Común

Elementos NO comunes

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Metodología fundamentada en el principio de la jerarquía de la mitigación

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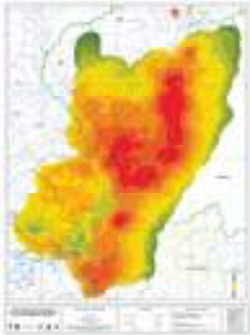
Línea Base en Biodiversidad – Caso Piloto del Cesar

Objetos de Conservación

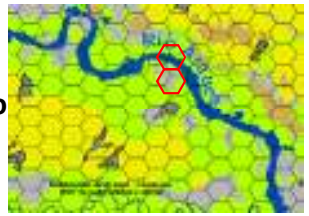
Ecosistemas Especies

Amenazas



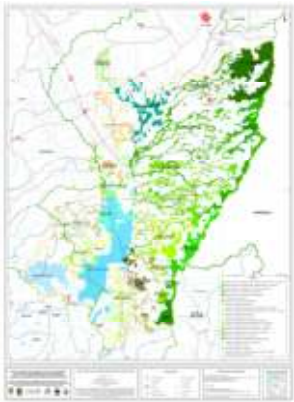
Marxan (algoritmo para selección De áreas prioritarias)

Metas de conservación



Áreas prioritarias de conservación

Áreas prioritarias



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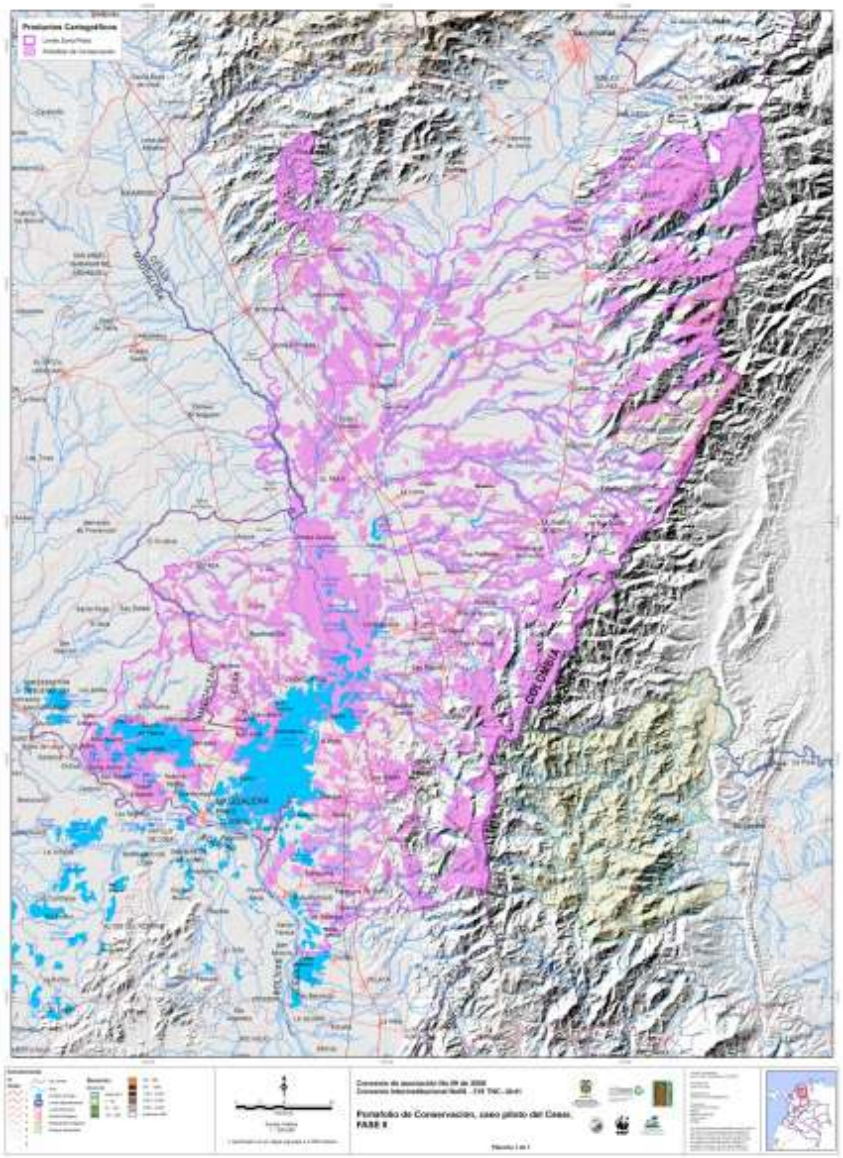
Portafolio áreas prioritarias – Áreas de exclusión



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Metodología fundamentada en el principio de la jerarquía de la mitigación

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Compensaciones por pérdida de biodiversidad

Medidas de compensación por pérdida de biodiversidad. Consiste en acciones dirigidas a resarcir y retribuir a la biodiversidad por los impactos negativos no prevenibles, mitigables o corregibles generados por proyectos, obras o actividades; de manera que se garantice la conservación efectiva en un área del mismo tipo de ecosistema con igual o mayor viabilidad, bajo nivel de amenaza y un adecuado nivel de protección.

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Compensaciones por pérdida de biodiversidad

1. Que y cuanto compensar
2. Donde compensar
3. Como compensar

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1. Cuanto compensar

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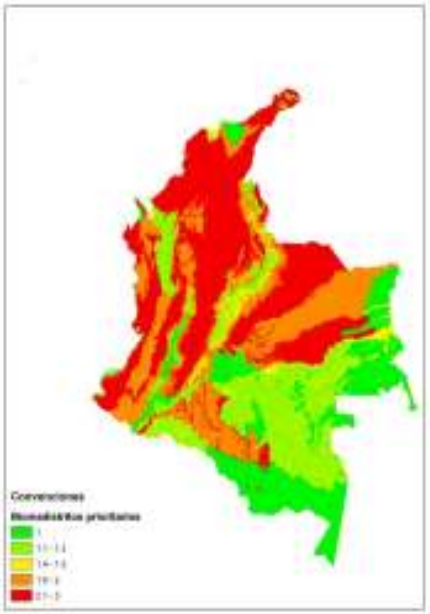
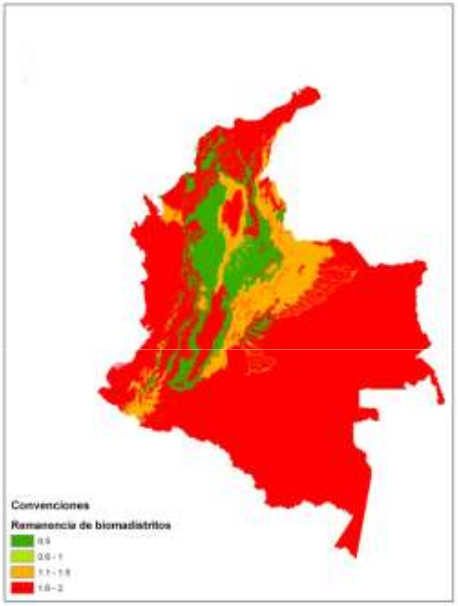
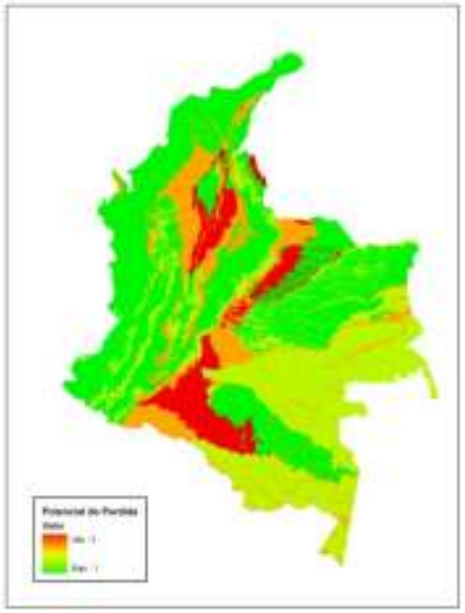
Factores de Compensación







Representatividad + **Remanencia** + **Rareza** + **Potencial de pérdida**

3 2 2 3

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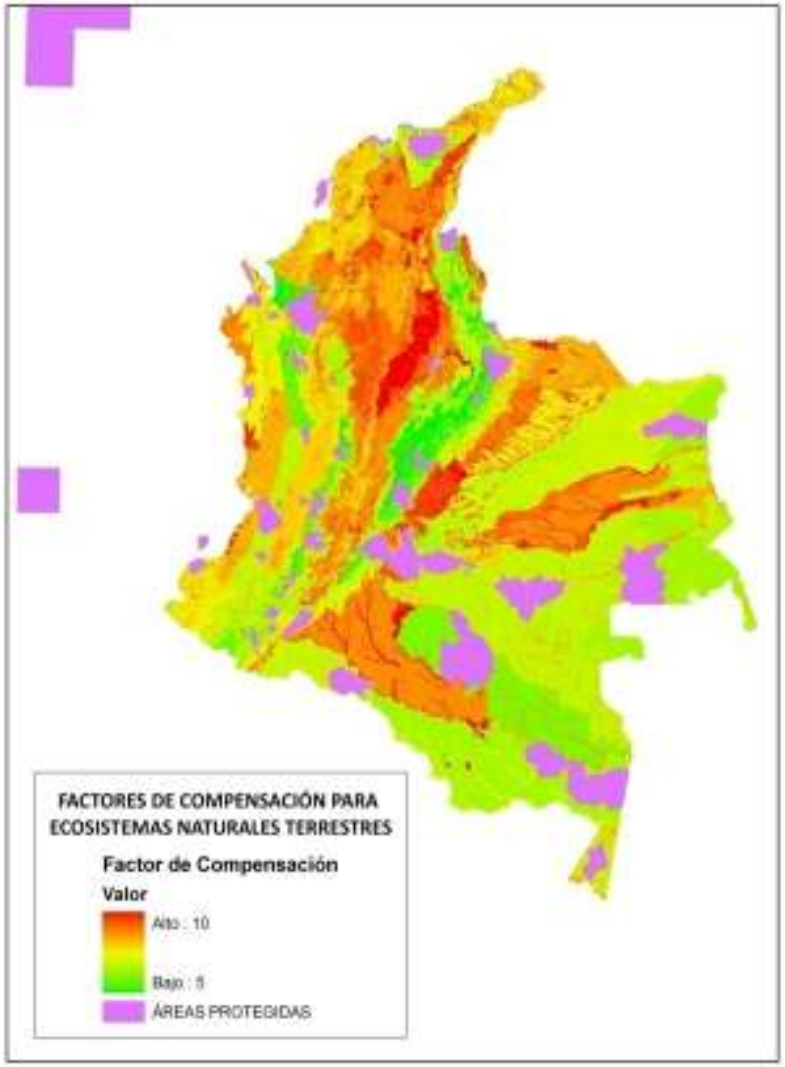
Factor de compensación por perdida de biodiversidad



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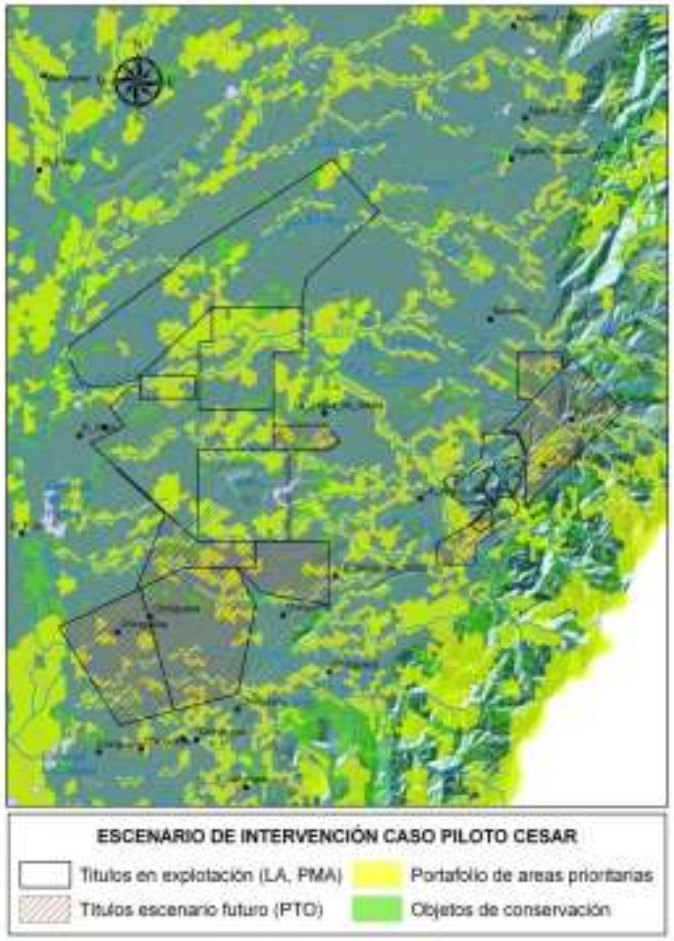
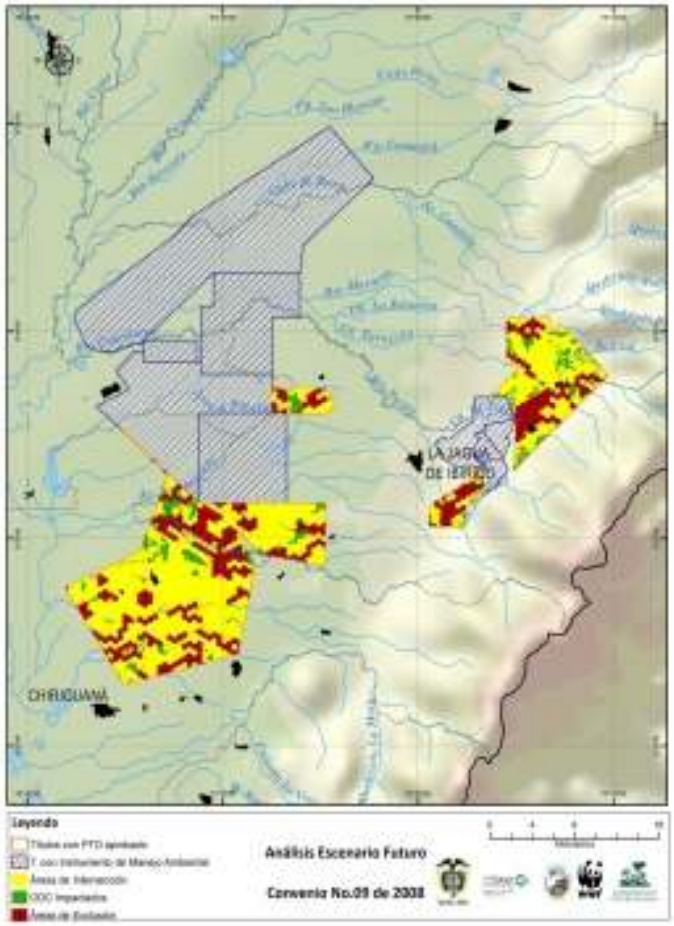
Aplicación al caso piloto del Cesar. Escenario futuro desarrollo



1. Escenario de Intervención



2. Áreas de exclusión

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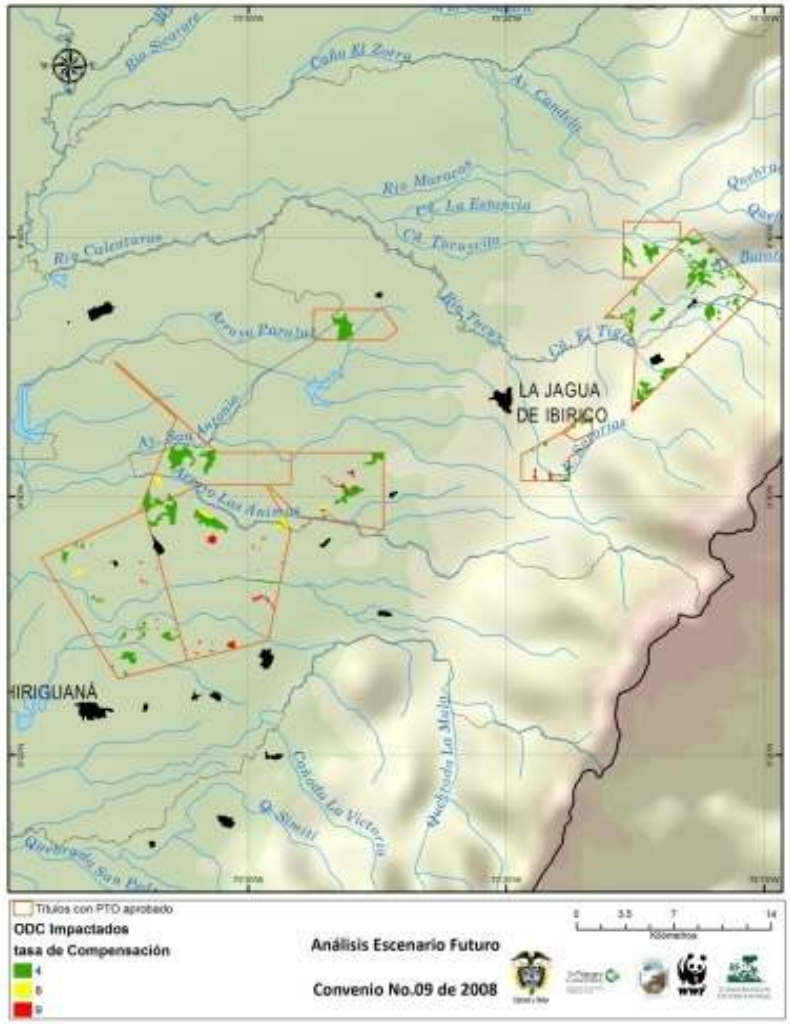
Compensaciones por perdida de biodiversidad
Aplicación al caso piloto del Cesar



Área potencialmente impactada: 2.517,66 Ha

Área a compensar: 12.890 Ha

Factores de compensación entre 8 a 9 para ecosistemas naturales

3. Factor de compensación – cuanto compensar

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2. Donde compensar

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Variables de selección

- Ser el mismo tipo de ecosistema natural afectado.
- Igual o mayor tamaño (área definida por el factor de compensación).
- Igual o mayor contexto paisajístico al fragmento del ecosistema impactado.
- Igual o mayor riqueza de especies al fragmento del ecosistema impactado.
- Igual o menor nivel de amenaza al fragmento del ecosistema impactado.

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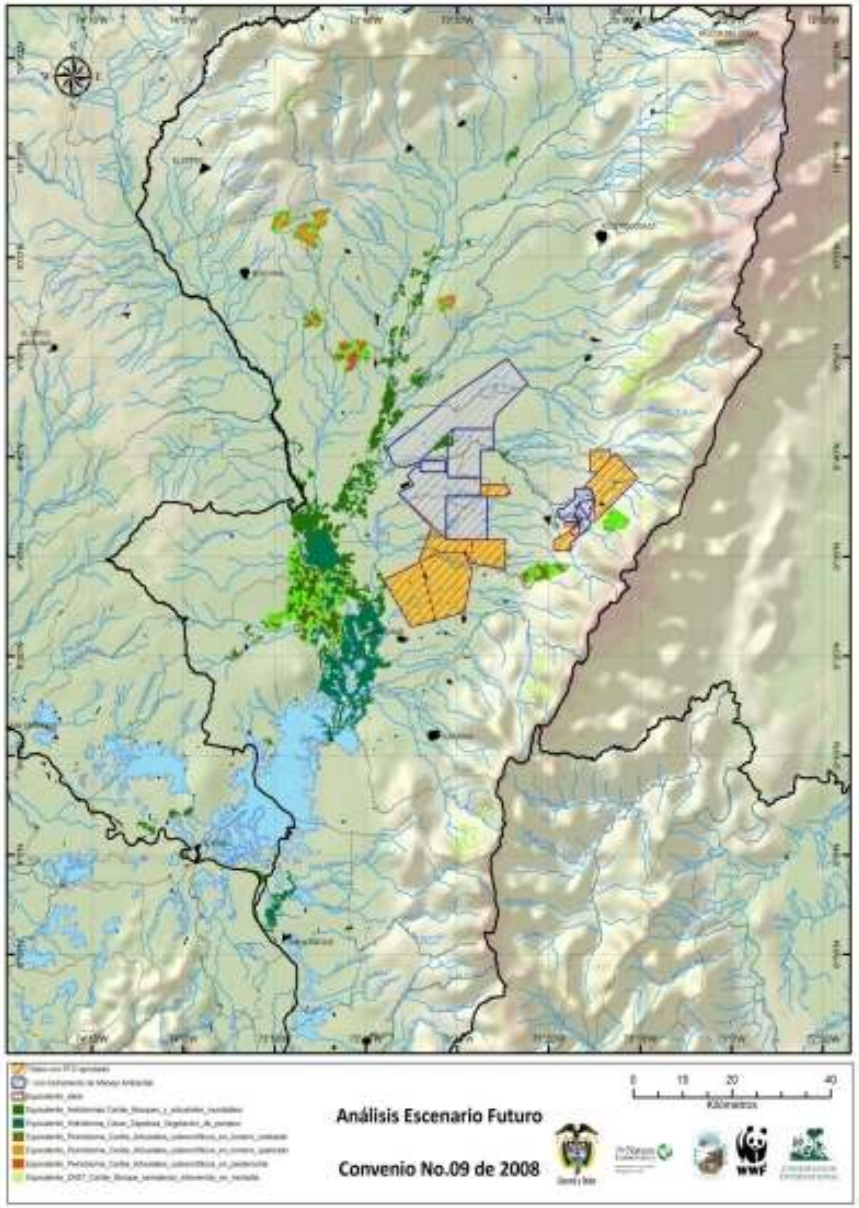

Donde compensar– Herramienta Ma.F.E v1.0

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3. Como compensar

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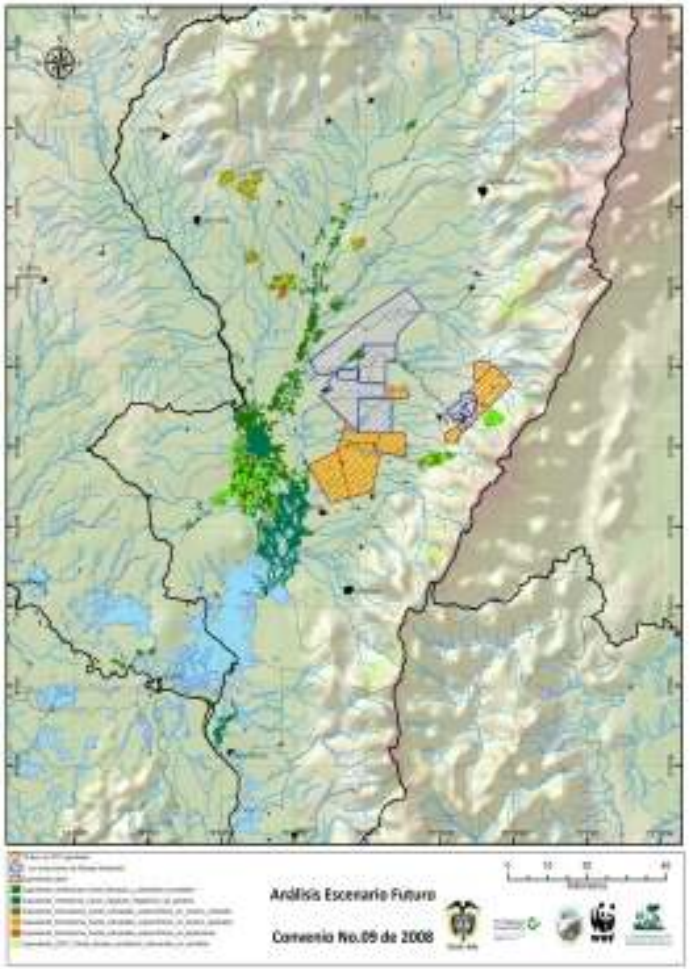

OBJETO DE CONSERVACIÓN	AREA A COMPENSAR	COMPENSACIÓN CON PROTECCION	ÁREAS CON POTENCIAL DE PROTECCION (ha)	ÁREA A RESTAURAR
Helobiomas Caribe_Bosques y arbustales inundables	5,47	**SI**	29.286	
Hidrobioma Cesar-Zapatosa_Vegetación de pantano	1.310,55	**SI**	22.887	
Peinobioma Caribe_Arbustales subxerofíticos en lomerio ondulado	3.624,04	**SI, pero requiere restauración**	1.483	2.141,04
Peinobioma Caribe_Arbustales subxerofíticos en lomerio quebrado	3.687,24	**SI, pero requiere restauración**	2.349	1.338,24
Peinobioma Caribe_Arbustales subxerofíticos en piedemonte	4.038,22	**SI, pero requiere restauración**	1.730	2.308,22
ZAST Caribe_Bosque semidenso intervenido en montaña	128,94	**SI**	8.407	

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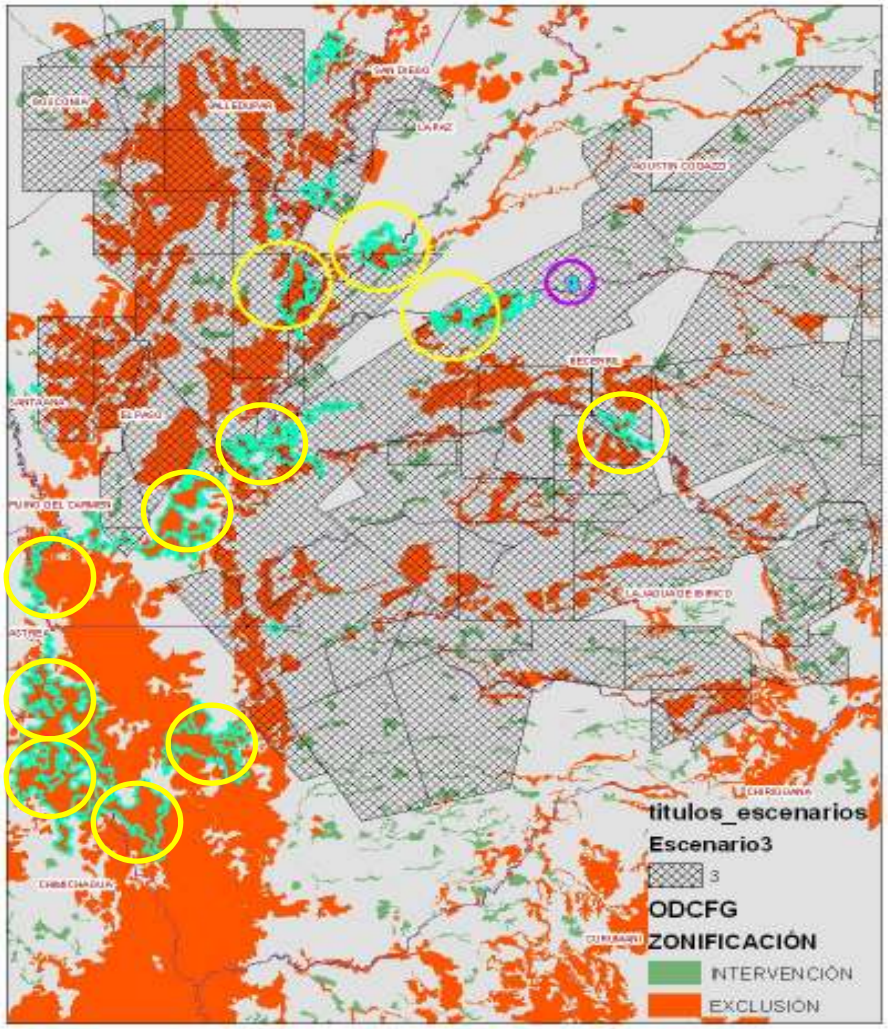
Como compensar – Conservar y/o restaurar



Ecosistema Impactado/perdido

Ecosistemas equivalentes al impactado

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2. Donde compensar– Herramienta Ma.F.E v1.0

3. Como compensar – Preservar y/o restaurar

❑ Acciones de preservación

Compra de predios privados para la creación o ampliación de áreas protegidas públicas o privadas
Financiar el proceso de declaratoria del área protegida
Financiar el plan de manejo de un área protegida durante la vida útil del proyecto licenciado.
Establecer acuerdos de conservación con propietarios privados, comunidades indígenas o afrocolombianas

❑ Acciones de restauración

Desarrollo de procesos de restauración ecológica, rehabilitación o recuperación y su mantenimiento por el periodo o vida útil del proyecto licenciado.

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3. Como compensar – Conservar y/o restaurar

Opciones de manejo de recursos:

- ❑Constitución de fondos fiduciarios privados.
- ❑Utilizar fondos ya establecidos para la administración de los recursos. (mixtos o privados)
- ❑Ejecución directa de recursos.

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Conclusiones

- Las Compensaciones serán definidas de forma técnica y estandarizada, lo cual reduce la incertidumbre de los sectores y la autoridad ambiental y brinda seguridad jurídica.

- La valoración de compensaciones no solo tendrá en cuenta la perdida de área local si no también la afectación del contexto regional y nacional con enfoque ecosistémico.

- Las compensaciones contribuirán de manera efectiva a la conservación y restauración de ecosistemas, asegurando su manejo en el tiempo.

- La metodología de compensaciones fue adoptada por la Metodología general para la presentación de Estudios Ambientales del MAVDT 2010.

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Conclusiones

- De no excluirse el portafolio de conservación del valle central del Cesar de cualquier tipo de desarrollo, la pérdida de biodiversidad generada no podría ser compensada dada la baja conectividad y alta fragmentación del paisaje.

- El desarrollo de la minería en el Valle Central del Cesar, cuenta con una nueva herramienta que permite evitar y minimizar impactos sobre las áreas prioritarias de conservación.

- El sector minero puede contribuir significativamente a la conservación de los últimos remanentes de ecosistemas naturales del Cesar, mediante las nuevas medidas de compensación derivadas del licenciamiento ambiental.

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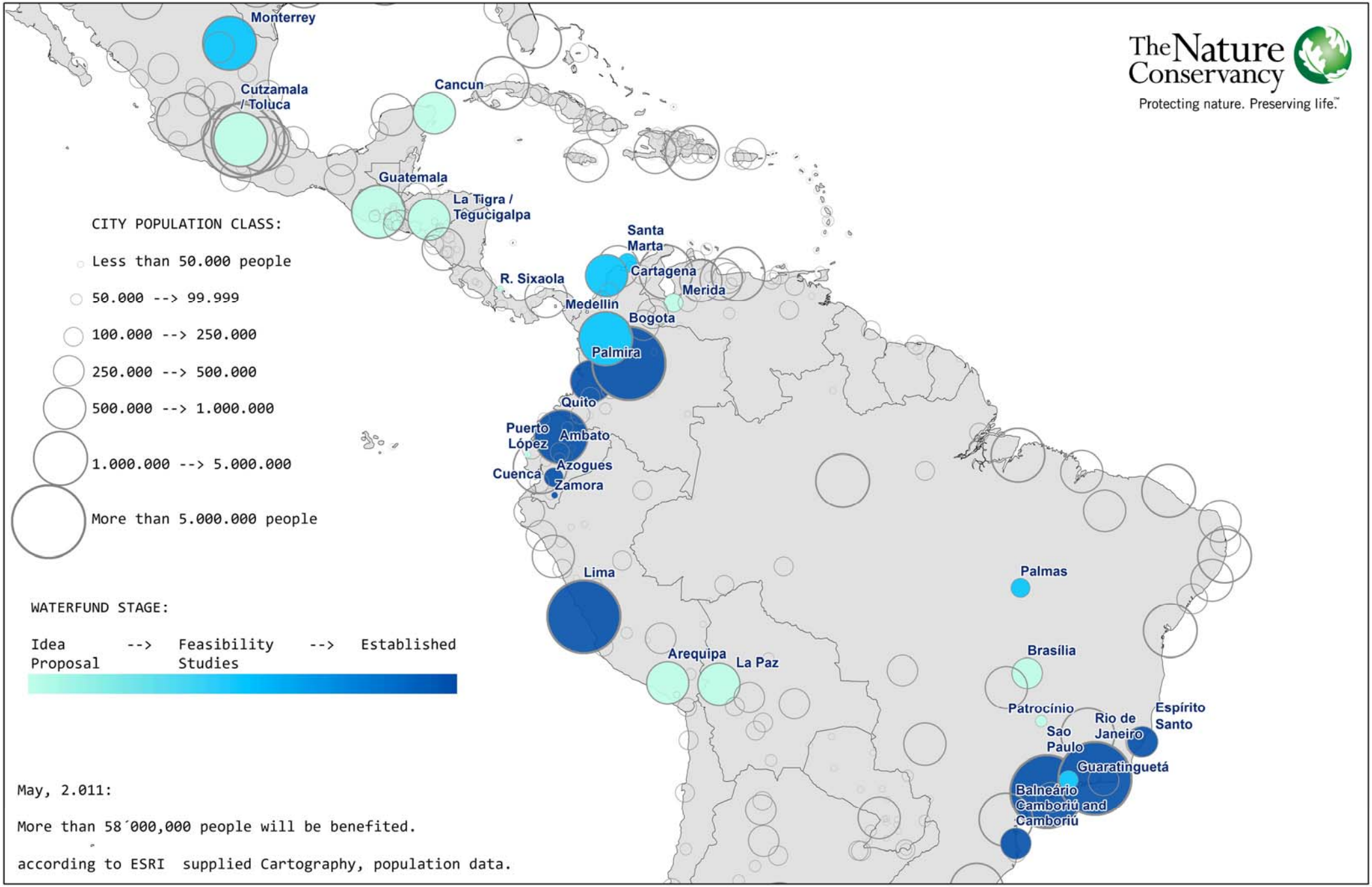
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Zamora
Lima
Arequipa
La Paz
Palmas
Brasília
Patrocínio
Sao Paulo
Rio de Janeiro
Espírito Santo
Guaratinguetá
Balneário Camboriú and Camboriú
CITY POPULATION CLASS:
Less than 50.000 people
50.000 --> 99.999
100.000 --> 250.000
250.000 --> 500.000
500.000 --> 1.000.000
1.000.000 --> 5.000.000
More than 5.000.000 people
WATERFUND STAGE:
Idea Proposal --> Feasibility Studies --> Established
May, 2.011:
More than 58´000,000 people will be benefited.
according to ESRI supplied Cartography, population data.

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Policy Development for Biodiversity Offsets: A Review of Offset Frameworks

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Abstract Biodiversity offsets seek to compensate for residual environmental impacts of planned developments after appropriate steps have been taken to avoid, minimize or restore impacts on site. Offsets are emerging as an increasingly employed mechanism for achieving net environmental benefits, with offset policies being advanced in a wide range of countries (i.e., United States, Australia, Brazil, Colombia, and South Africa). To support policy development for biodiversity offsets, we review a set of major offset policy frameworks—US wetlands mitigation, US conservation banking, EU Natura 2000, Australian offset policies in New South Wales, Victoria, and Western Australia, and Brazilian industrial and forest offsets. We compare how the frameworks define offset policy goals, approach the mitigation process, and address six key issues for implementing offsets: (1) equivalence of project impacts with offset gains; (2) location of the offset relative to the impact site; (3) "additionality" (a new contribution to conservation) and acceptable types of offsets; (4) timing of project impacts versus offset benefits; (5) offset duration and compliance; and (6) "currency" and mitigation replacement ratios. We find substantial policy commonalities that may serve as a sound basis for future development of biodiversity offsets policy. We also identify issues requiring further policy guidance, including how best to: (1) ensure conformance with the mitigation hierarchy; (2) identify the most environmentally preferable offsets within a landscape context; and (3) determine appropriate mitigation replacement ratios.

Keywords Biodiversity offsets · Mitigation hierarchy · Environmental compensation · Policy · Conservation planning · Mitigation replacement ratio

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Introduction

Human actions have altered about one-third to one-half of Earth's land surface (Vitousek and others 1997), causing considerable impacts to biodiversity. With global economic output expected to double over the next two decades (World Bank 2006), such impacts could increase dramatically. Tremendous investments are expected in energy, mining, and infrastructure sectors, among others. For example, the International Energy Agency (2007) forecasts more than $20 trillion in energy investments through 2030.

Biodiversity offsets are potentially a powerful tool for balancing conservation and development. Offsets seek to compensate for residual environmental impacts of project development, after appropriate steps have been taken to avoid and minimize impacts on site (ten Kate and others 2004). Countries including the United States, Australia, Brazil, Colombia, South Africa, Netherlands, Sweden, and United Kingdom have established or are developing offset policies to protect both species and ecosystems. The cumulative influence of advancing these regulatory and voluntary policies is large and growing, but interest in offsets is not restricted to governments. Multinational corporations such as Rio Tinto (2004) aim to have a "net positive impact on biodiversity" as part of their biodiversity strategy, and offsets will play an important role in meeting this objective.

With interest in biodiversity offsets increasing worldwide, we seek to strengthen the basis for policy development through a review of major offset policy frameworks in the United States, European Union, Australia, and Brazil. By comparing the goals, approaches, and key issues highlighted in these frameworks, and distilling important commonalities and differences, our aim is to provide guidance to countries that have not yet developed frameworks and to support improvements in existing policies. The frameworks selected for review include both established offset programs and rapidly emerging policies.

- US Wetlands Mitigation: This is the most mature of the offset frameworks reviewed, with its foundation in the section 404 amendments to Clean Water Act (33 U.S.C. § 1344). Wetlands mitigation aims to avoid and minimize impacts, and then offset residual impacts through compensatory mitigation that replaces wetland functions and values. Relevant policies include the US Environmental Protection Agency and Department of the Army (1990) memorandum of agreement on determining mitigation under section 404(b)(1) guidelines, federal guidance on wetland mitigation banking (US Army Corps of Engineers and others 1995), and regulations issued in 2008 governing compensatory mitigation for losses of aquatic resources (33 C.F.R § 325 and 332; 40 C.F.R. § 230).
- US Conservation Banks: Conservation banking is modeled after wetland mitigation, except that the objective is to offset adverse impacts to species, rather than replace wetland functions and values. California's Resources Agency and Environmental Protection Agency (1995) were first to issue guidance for conservation banking, followed by the US Department of the Interior (2003).
- EU Natura 2000: The Birds Directive of 1979 (Council of the European Communities 1979) and Habitats Directive of 1992 (Council of the European Communities 1992) underpin the effort to establish a network of Natura 2000 conservation sites throughout the European Union. The European Commission issued guidance on offsets in 2000 and 2001.
- Australian Offset Policies: Australian offset policies are developing rapidly. The federal government supports offsets under the Environment Protection and Biodiversity Conservation Act of 1999. At the state/territory level, offset policies have been developed in New South Wales, Victoria, Western Australia, South Australia, and Queensland, with most focused on offsetting the clearance of native vegetation. New South Wales has introduced BioBanking, a market-based offsets approach involving ecosystem and species credits (NSW DECC 2007).
- Brazilian Industrial and Forest Offsets: Brazilian federal legislation requires industrial developments to offset their environmental impacts through payments to the National Protected Areas System (Brazil Fed. Law 9985, Decree 4340). The system is still in its early stages of development, especially with regard to equivalency between industrial environmental impact and the benefits derived from offset payments. For Brazilian forest offsets, federal legislation requires that a minimum area of natural vegetation be maintained on private landholdings (Brazil Fed. Law 4771, Provisional Measures 2166/67). However, the legislation allows for off-site conservation offsets to compensate for natural vegetation clearing that exceeds the required minimum.

Offset Policy Goals

For the frameworks reviewed, we find offset policy goals vary from "net gain" to "no net loss" to general statements about the need to address adverse impacts. In the US, the Water Resources Development Act of 1990 directs wetlands mitigation to seek "an interim goal of no overall net loss of the Nation's remaining wetlands base, as defined by acreage and function, and a long-term goal to increase the quality and quantity of the Nation's wetlands, as defined by acreage and function" (33 U.S.C. § 2317). Offset goals in Australia often go a step further calling for net environmental gains. Native vegetation regulations in New South Wales require that offsets "improve or maintain" environmental outcomes for relevant environmental values (NSW DNR 2005; NSW DECC 2007). The values include water quality, salinity, biodiversity, and land/soil degradation. Victoria's Department of Natural Resource and Environment (2002) calls for a reversal in the decline of native vegetation "leading to a net gain" while Western Australia's Environmental Protection Agency (2006) states "offsets should be used with an aspiration of achieving a 'net environmental benefit'."

Brazilian forest policy implies no net loss of habitat by requiring private landholders to retain a defined minimum forest/vegetation cover, with the minimum area requirement varying by region, such as 80 percent for Amazon Forest and 35 percent for Amazon Savannah (Brazil Fed. Law 4771, Provisional Measures 2166/67). Where a private landholder is not meeting the minimum area requirement, the policy allows for compensation through the establishment of off-site conservation offsets. States such as Minas Gerais and Paraná are developing systems to formalize the offset mechanism through crediting systems.

US conservation banking, EU Natura policy goals, and Brazilian industrial offsets do not directly address issues of no net loss or net gain. Conservation banking objectives are to offset adverse impacts to threatened and endangered species, but federal and state guidance do not specify *how much* such impacts should be offset. For the EU Natura 2000 network, the stated goal is to maintain overall (ecological) coherence of the sites (European Commission 2000). This goal appears open to wide interpretation, since it presumes the original network (when it is fully developed) will be coherent and that impacts will be measurable in a manner that allows for determinations regarding violations of "coherence." Brazilian industrial offset legislation defines no linkage between environmental impacts and the benefits of offset payments, therefore making it impossible to measure net difference in environmental values.

Mitigation Hierarchy

We find strong support across the frameworks for the mitigation hierarchy of: (1) avoiding impacts, (2) minimizing impacts, and then (3) offsetting/compensating for residual impacts. This approach was first established for US wetlands mitigation (US EPA and DA 1990), and policies in Australia and the European Union have adopted a similar mitigation hierarchy. Under US wetlands policy, the first step is to avoid adverse impacts "to the maximum extent practicable" (US EPA and DA 1990). An alternative is considered practicable "if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes" (40 C.F.R. § 230.3(q)). Any unavoidable impacts should then be minimized "to the extent appropriate and practicable," after which, remaining impacts require compensatory mitigation (US EPA and DA 1990). The policies reviewed make clear that offsets are intended as an option of last resort, to be considered in addressing residual impacts after efforts to avoid and minimize have been undertaken.

In the first step of the sequence (avoidance), it is important to note that impacts to unique and rare habitats, special aquatic sites, and other critical environmental assets are generally prohibited; they must be avoided unless it is an exceptional case. In evaluating the proposed impact site against potential alternatives, the main criterion is which site represents the least environmentally damaging option. US wetlands policy notes that "compensatory mitigation may not be used as a method to reduce environmental impacts" to make a potentially avoidable project appear more acceptable (US EPA and DA 1990). Likewise, under Natura 2000 the European Commission (2000) makes clear that in considering alternative solutions for a proposed project, "other assessment criteria, such as economic criteria, cannot be seen as overruling ecological criteria." If project alternatives cannot be identified, rather than weighing potential measures for minimizing impacts, the European Commission first requires an assessment of whether there are "imperative reasons of overriding public interest, including those of a social or economic nature, which require the realization of the plan or project in question."

While offset policies are in consensus on following the mitigation hierarchy, quantitative guidelines for this decision-making process are lacking (Race and Fonseca 1996; Gibbons and Lindenmayer 2007; Burgin 2008) A key challenge for future application of offsets will be establishing a clear and defensible process for determining when offsets are an appropriate tool in conformance with the mitigation hierarchy, and when offsets should be rejected in favor of more intensive efforts at steps higher up in the mitigation hierarchy (avoid and minimize).

To address this challenge, Kiesecker and others (2009a) propose a framework for blending landscape-level conservation planning with application of the mitigation hierarchy. Their framework, referred to as "Development by Design," follows the basic principles of systematic conservation planning. Conservation planning is the process of locating, configuring and maintaining areas that are managed to maintain viability of biodiversity and other natural features (e.g., Pressey and Bottrill 2008). A conservation portfolio (= priority sites), the end product of conservation planning, is a selected set of areas that represents the full distribution and diversity of these systems (e.g., Noss and others 2002). Often ecoregional plans utilize an optimization approach automated with spatial analysis tools such as Marxan (Ball and Possingham 2000) that will facilitate the examination of development/conservation tradeoffs and mitigation recommendations (avoid versus offset). Proposed developments can be mapped and assessed relative to a conservation plan and the minimum viability needs of target species and ecological communities. Overlap between a conservation portfolio and proposed development may result in a "redrawing" of the portfolio to recapture habitat needed to ensure biodiversity goals are met. However, if minimum viability goals cannot be met through "redrawing" the portfolio, the proposed development would need to take further steps to avoid and minimize impacts, to the degree necessary to maintain the viability of the biological targets. The aim of this approach is to provide a goal-based, stakeholder-driven process that supports compatibility between development and conservation goals, guiding decision-making on where impacts to biodiversity may be offset and where they should be avoided or minimized.

NSW BioBanking takes a similar approach, applying irreplaceability and vulnerability criteria to support conformance with the mitigation hierarchy and identifying "red flag" areas where biodiversity conservation values are high and impacts should be avoided (NSW DECC 2008). Red flag areas are determined based on vegetation types and the estimated distribution remaining in the catchment management authority, the presence of critically endangered or endangered ecological communities, and the presence of threatened species. There may be some circumstances in which impacts to a red flag area are allowed. Considerations include satisfaction that all reasonable measures to avoid impacts have been taken, impacts are not to a highly cleared vegetation type of a size greater than four hectares, the site's contribution to regional biodiversity values is low, the viability of biodiversity values at the site is low, and other considerations (NSW DECC 2008).

Key Challenges to Implementing Offsets

Effective offset policies must address a number of challenging questions, including: What counts as an offset? How much does it count? Where should the offset be located? When does it need to be operational and for how long? How should risks be managed and what if the offset fails? We draw together these implementation challenges into a set of six methodological issues and compare how offset policies are attempting to address them (Table 1).

- Equivalence of project impacts with offset gains (in-kind versus out-of-kind)
- Location of the offset relative to the impact site (on-site versus off-site)
- "Additionality" (new contribution to conservation) and acceptable types of offsets
- Timing of project impacts versus offset benefits
- Offset duration and management
- "Currency" and mitigation replacement ratios

Our review finds an emerging consensus on basic principles for addressing these issues. But detailed guidance often remains elusive. In part, this reflects the difficulties associated with providing one-size-fits-all guidance for offset programs aimed at addressing complex impacts that vary with the local context.

Equivalence (In-Kind Versus Out-of-Kind)

As no two areas are ecologically identical, how can offsets best provide benefits that are "equivalent" to losses caused by project impacts? Are offsets required to be established on an "in-kind" basis, or is "out-of-kind" compensation possible?

"In-kind" offsets refer to compensatory mitigation that provides habitat, functions, values, or other attributes similar to those affected by the project, whereas "out-of-kind" offsets allow for different forms of compensation. Offset policies indicate a general preference for in-kind compensatory mitigation, with the European Commission (2000) calling for compensation under Natura 2000 that is in "comparable proportions" providing comparable functions and Western Australia's Environmental Protection Agency (2006) seeking "like for like or better." In Victoria, Australia mitigation must be "commensurate," with direct in-kind replacement only required where vegetation losses are of "higher significance" according to a grading system (Victoria DNRE 2002; Parkes and others 2003). For losses of lower significance, the program provides more flexibility and discretion to local planning authorities to determine whether out-of-kind mitigation should be supported to "optimise conservation outcomes." Brazil's forest offset system only requires an offset to be of the same ecosystem type (Brazil Fed. Law 4771, Provisional Measures 2166/67).

Until recently, US wetlands mitigation policy explicitly stated that "in-kind compensatory mitigation is preferable to out-of-kind" (US EPA and DA 1990). This preference was based on the premise that full and equivalent replacement of losses is best achieved by compensating with the same type of habitat, functions, and services, and that this is particularly important when the affected area is considered locally important (US Army Corps of Engineers 2002). Recent regulations express a less explicit preference for in-kind mitigation, focusing instead on identifying the most "environmentally preferable" mitigation for aquatic resources in the watershed, even if it is an out-of-kind option (33 C.F.R. § 332.3 [40 C.F.R. § 230.93]). However, similar to the approach in Victoria, Australia, the regulations call for in-kind mitigation where wetlands are of higher significance: "For difficult-to-replace resources (e.g., bogs, fens, springs, streams, Atlantic white cedar swamps) if further avoidance and minimization is not practicable, the required compensation should be provided, if practicable, through in-kind rehabilitation, enhancement, or preservation since there is greater certainty that these methods of compensation will successfully offset permitted impacts" (33 C.F.R. § 332.3(e)(3) [40 C.F.R. § 230.93(e)(3)]).

For impacts to species, US conservation banking guidance calls for mitigation measures that "fit within the conservation needs of the species," rather than focusing on replacing the exact (in-kind) functions and values of specific habitat adversely affected by a project (US DOI 2003). But mitigation must support the affected species; conservation benefits "for one group of species cannot be used to offset impacts to a species not part of the group." Likewise,

Table 1 How offset policies in the United States, European Union, Australia, and Brazil address key implementation issues

Key issues	US wetlands mitigation	US conservation banking	EU natura 2000	Australian native vegetation offsets	Brazilian industrial offsets	Brazilian forest offsets
Equivalence	Most environmentally preferable option, in-kind for difficult-to-replace resources	In-kind for species; must support conservation needs of the species	Comparable proportions and functions	"Commensurate" or in-kind (especially for losses of high significance)	No preference	Same ecosystem type
Location	Same watershed	Same service area (US FWS); provides best long-term benefit to species	Same biogeographic region in the same Member State; same bird migratory path	Adequate geographic link between losses and offsets; closer to on-site when losses are high significance	No preference, but if impacts are to a protected area, offset must benefit that protected area	Same watershed
Additionality and types of offsets	Must be additional; prefer restoration; allow establishment, enhancement, and preservation	Must be additional; no specific constraint on type of offset	Must be additional; re-creating habitat, or in exceptional cases proposing a new site	Must be additional; full range of offset types allowed	No requirement; supports funding of Brazil's protected areas system	Must be additional to required conservation area on any private landholding
Timing	Before first credit is sold/debited, need to have secured site, approved mitigation plan, and assurances	Offset must be operable at time first credit is sold	Offset must be operable at time when project damage is effective	Flexible; timing is factored into scoring	Offset payment required prior to environmental permitting	Offset is retroactive, addresses land clearing that has already occurred
Duration	Self-sustaining; preservation must be permanent	Perpetuity only	Perpetuity preferred	Perpetuity preferred; in place as long as on-site impacts	Perpetuity preferred	Perpetuity preferred
Currency and offset ratios	Based on lost aquatic resources; at least 1 to 1 ratio by acreage or linear foot	Based on species and habitat values, at least 1 to 1 ratio for area supporting nest site or family group	Based on impacts to species, habitat, and functions	Based on assessment methodology in NSW; "Habitat hectares" framework in Victoria	Commensurate with impacts (minimum payment of 0.5% of total capital costs of project)	Defined ratio of 1 to 1

Natura 2000 requires that offsets for birds be along the same migration path and "accessible with certainty by the birds usually occurring on the site affected by the project" (European Commission 2000).

It is worth noting that despite the trend toward greater acceptance of out-of-kind offsets, as evidenced by policies in the United States and Australia, there is little to no support (legal, regulatory, or otherwise) for "very out-of-kind" forms of mitigation such as funding for conservation training and education. Indeed, US federal guidance on the use of in-lieu-fee arrangements for wetlands specifically rejects such approaches to offsets, noting that "funds collected under any in-lieu-fee arrangement should be used for replacing wetlands functions and values and not to finance non-mitigation programs and priorities (e.g., education projects, research)" (US Army Corps of Engineers and others 2000). Brazil's industrial offsets may be the only exception here, as the types of environmental impacts are not linked to the objectives of conservation expenditures made with offset payments (Brazil Fed. Law 9985, Decree 4340).

Location of Offset Relative to Impact Site (On-Site Versus Off-Site)

Do offset benefits need to accrue to the local geographic area affected by project impacts? What if a proposed "local" offset provides considerably less environmental benefit than other more distant proposed alternatives?

While offset frameworks are in broad consensus that mitigation benefits should accrue to affected areas, guidance differs on how proximate offsets need to be to an impacted site. Until recently US wetlands mitigation policy called for compensatory actions to "be undertaken, when practicable, in areas adjacent or contiguous to the discharge site" (US EPA and DA 1990). This approach was criticized for encouraging reactive, piecemeal mitigation projects with high failure rates, and for inadequate consideration of the watershed context (National Research Council 2001), as mitigation approaches at this scale may increase benefits (McAllister and others 2000).

Wetlands mitigation regulations issued in 2008 drop the preference for on-site compensatory mitigation in favor of using a watershed approach "to the extent appropriate and practicable" (33 C.F.R. § 332.3(c) [40 C.F.R. § 230.93(c)]). Under a watershed approach, compensatory mitigation should be located within the same watershed as the impact site, and where it can most successfully replace lost functions and services. The approach should take into account watershed scale features such as aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources, land use trends, ecological benefits, and compatibility with adjacent land uses (33 C.F.R. § 332.3(b) [40 C.F.R. § 230.93(b)]).

For US conservation banking and Australian native vegetation offsets, location decisions are similarly linked to the overarching conservation goal. Conservation banking guidance supports off-site banks where they are environmentally preferable or where on-site measures are not practicable (US DOI 2003). The priority in bank location decisions is to provide for the long-term conservation of habitat and species. In practice, banks are sited within a "service area" defined by the US Fish and Wildlife Service based on physical and ecological attributes such as watersheds, soil types, species recovery units, and/or species and population distributions (US FWS 2006). In Victoria, Australia the need for on-site mitigation for native vegetation impacts varies based on the quality of the vegetation proposed for clearance. Although the program calls for "an adequate geographic link between losses and offsets," it only requires offsets to be "as close as possible" when "higher significance" vegetation is affected (Victoria DNRE 2002; Parkes and others 2003). For vegetation losses of lower significance, local planning authorities have discretion to determine whether off-site mitigation would be preferable.

Other offset frameworks note geographic boundaries for locating offsets, but provide less guidance on location decisions. The European Commission (2000) requires Natura 2000 offsets to be in "the same biogeographical region in the same Member State" while Brazil's forest offset system calls for offsets to be within the same watershed (Brazil Fed. Law 4771, Provisional Measures 2166/67). Brazil's industrial offsets place no geographic boundary on the expenditure of offset funds, unless the industrial development impacts a protected area, in which case the protected area becomes the beneficiary (Brazil Fed. Law 9985, Decree 4340).

"Additionality" and Acceptable Types of Offsets

To what degree must offsetting activities represent genuinely new and additional contributions to conservation? What types of offsets activities (e.g., restoration, protection) can be undertaken to deliver compensatory mitigation?

"Additionality" refers to the need for offsets to provide a new contribution to conservation, additional to any existing values. This is a widely held principle of the frameworks reviewed. For example, US conservation banking guidance states unambiguously that "land used to establish conservation banks must not be previously designated for conservation purposes (e.g., parks, green spaces, municipal watershed lands)" (US DOI 2003). Offset regulations in New South Wales, Australia call for offsets to be "additional to actions or works carried out using public funds or to fulfill regulatory obligations"

(NSW DNR 2005). And in Brazil, a landowner offsetting the forest-clearing liability of another landowner must maintain conserved areas that total the minimum required conservation land for the parcel (e.g., 20 percent) plus additional conservation land equal to the liability.

Under the additionality requirement, several types of offsets are deemed acceptable compensation. For Natura 2000, compensatory measures can consist of re-creating habitat, or in exceptional cases proposing a new site. Native vegetation programs in Australia allow for a wide array of compensation, including re-vegetation, regeneration, restoration, enhancement, removal of threats, improved management (e.g., control of weeds), avoidance of further permitted impacts (e.g., stock grazing), and protection. Rather than a specific compensation mechanism, US conservation banking relies on a "range of strategies" including "preservation, management, restoration of degraded habitat, connecting separated habitats, buffering of already protected areas, creation of habitat, and other appropriate actions" (US DOI 2003).

Wetlands mitigation favors restoration over other compensation options "because the likelihood of success is greater and the impacts to potentially ecologically important uplands are reduced compared to establishment, and the potential gains in terms of aquatic resource functions are greater, compared to enhancement and preservation" (33 C.F.R. § 332.3(a)(2) [40 C.F.R. § 230.93(a)(2)]). Restoration is divided into "re-establishment" (i.e., returning natural or historic functions to a former wetland with a resultant gain in wetland acres) and "rehabilitation" (i.e., repairing natural or historic functions of a degraded wetland with a resultant gain in wetland functions but not acres). If restoration is not possible, wetland establishment, enhancement (e.g., water quality improvement), and preservation may be acceptable forms of compensation. Wetland preservation, however, is only an allowable option when the wetland resources proposed for preservation provide physical, chemical, or biological functions important for the sustainability of the watershed, the resources are under threat of destruction or adverse modifications, and the site will be permanently protected (33 C.F.R. § 332.3(h) [40 C.F.R. § 230.93(h)]).

Timing of Project Impacts and Offset Benefits

As some offsets will require a number of years before ecological maturity brings full benefits, when does an offset need to be operational – before, concurrent with, or following project impacts?

In principle, the frameworks reviewed call for offsetting activities to be operational and proven *prior* to allowing project impacts. For example, the European Commission (2000) makes clear that under Natura 2000 "the [compensatory] result has normally to be operational at the time when the damage is effective on the site concerned with the project unless it can be proved that this simultaneity is not necessary to ensure the contribution of this site to the Natura 2000 network." Likewise, US conservation banking guidance states "at the time the first credit in a bank or phase of a bank is sold, the land within the bank or its phase must be permanently protected through fee title or a conservation easement, with any land use restrictions set in perpetuity for the land legally established" (US DOI 2003). The aim of requiring effective offsets prior to project impacts is to safeguard against a temporal loss of conservation values. Project impacts cause immediate and certain losses, whereas the conservation gains of an offset are uncertain and may require many years to achieve. Indeed some habitat features and systems take decades or more to develop and mature, with the risk that they may never provide an equivalent conservation value as what was lost (Burgin 2008).

While anticipatory approaches seek to ensure no temporal losses of values when compensating through offsets, they can also create some significant disincentives to developing offsets in the first place. First, if offsets are to compensate on a like-for-like basis, the anticipatory approach requires offset developers to foresee project impacts before they have occurred, which can be difficult for projects that are complex with a potentially wide range of impacts. Second, the anticipatory approach can impose substantial upfront costs for banking approaches if there is no ability to raise funds by releasing credits early (prior to the offset being operational). Offset planning, establishment, management, and operating costs must be borne for perhaps years before the offset meets specified performance standards (e.g., vegetation measures, hydrology criteria) and can be applied as compensation for impacts.

For these reasons, offset policies for Australian native vegetation and US wetland mitigation tend to take a more flexible approach to the timing of project impacts and offset benefits. For example, in Victoria, Australia temporal issues are factored in as another element subject to scoring, depending on when offsets are initiated (Victoria DNRE 2002). Under the BioBanking scheme in New South Wales, biodiversity credits are issued and can be sold on the open market once a BioBanking agreement has been approved (NSW DECC 2007). US wetland mitigation policy is somewhat more restrictive in that it only allows for credit releases in accordance with the achievement of specific milestones. Before an initial allocation of credits can be sold, a wetland bank/offset project must have a secured site, an approved mitigation plan, and other assurances need to be in place. Additional credits can be transacted as the bank/offset achieves ecological and performance-based milestones (e.g., construction, planting,

establishment of specified plant and animal communities) set out in its credit release schedule. This schedule should reserve a significant share of the total credits for release only after full achievement of ecological performance standards. Factors in determining a credit release schedule include the mitigation approach (e.g., restoration) and nature/amount of work, likelihood of success, and aquatic resource types and functions (33 C.F.R. § 332.8(o)(8) [40 C.F.R. § 230.98(o)(8)]). In light of this guidance, advance credit release is very common for US wetland mitigation banking. Environmental Law Institute (2002) estimates about 90 percent of US wetland banks sell some credits before achieving *any* performance standards.

Offset policies that allow for the immediate or phased release of credits, such as NSW BioBanking and US wetland mitigation banking, may not adequately address time-lag and uncertainty issues. To achieve "no net loss" outcomes, Moilanen and others (2008) suggest incorporating uncertainty in the effectiveness of restoration actions, correlation between success of different offset areas, and time discounting in the calculation of offset ratios. They find that when these factors are taken into account, offset ratios should be much higher to avoid net losses in conservation values.

Offset Duration and Management

What is the appropriate operable period for an offset – in perpetuity or equal to the duration of project impacts? What types of requirements, management, and assurances are needed?

Offset protection in perpetuity assumes project impacts are irreversible, whereas finite protection assumes there is potential to reverse damage at the project site. Our review finds consensus among the frameworks that offset protection in perpetuity is preferable, but in some cases offsets may be operable for only the duration of project impacts. For example, offset regulations for native vegetation in New South Wales, Australia call for offset benefits to "persist for at least the duration of the negative impact of the proposed clearing," though "permanent conservation measures are given greater value than other management actions" (NSW DNR 2005). US conservation banking policy provides no possibility of finite protection, requiring banks to "safeguard in perpetuity the species or habitat conservation values upon which the credits are based" (US DOI 2003). US wetlands mitigation regulations require offsets to be "permanent" if the compensatory action is preservation alone. For restoration, establishment, and enhancement actions, regulations call for offsets to be "self-sustaining once performance standards have been achieved" (33 C.F.R. § 332.7(b) [40 C.F.R. § 230.97(b)]). Where such offsets require active long-term management and maintenance (e.g., prescribed burning, invasive species control, maintenance of water control structures, easement enforcement) and/or long-term financing mechanisms, the responsible party must provide it.

As offsets are generally intended to operate for either the long-term or in perpetuity, the frameworks are in consensus on a number of management and compliance measures, including the need for management plans, performance standards, securing site tenure, restricting harmful activities, monitoring, legal and financial assurances, adaptive management, and contingency and remedial actions in the event of offset failure (US DOI 2003, European Commission 2000, 33 C.F.R. § 332.4(c)(2-14) [40 C.F.R. § 230.94(c)(2-14)]).

"Currency" and Mitigation Replacement Ratios

What is an appropriate "currency" or uniform trading unit to support compensation for project impacts with offset benefits? Given differences in ecological quality and other factors, on what basis can mitigation replacement ratios be established?

Offset policies support establishing a currency (debit/credit unit) that incorporates values associated with ecological functions, quality, and integrity, rather than basing currency simply on land area. With a currency established, mitigation replacement ratios can be determined, reflecting the number of credit units that must be provided through an offset to compensate one unit of loss at the project site (e.g., 3 to 1 ratio).

While currency and mitigation ratios are distinct concepts, policies often conflate them, adjusting mitigation ratios to reflect "quality" issues not accounted for in the currency unit. For example, wetlands mitigation requires a "mitigation ratio greater than one-to-one where necessary to account for…differences between the functions lost at the impact site and the functions expected to be produced by the compensatory mitigation project…" (33 C.F.R. § 332.3(f)(2) [40 C.F.R. § 230.93(f)(2)]). Mitigation ratios may be tailored based on a range of factors including the chosen compensation mechanism (e.g., restoration, preservation), equivalence of the offset (in-kind versus out-of-kind), conservation significance (unique versus common), location (on-site versus off-site, in/out of watershed, ecoregion, or service area), temporal lags between project impacts and offset maturity, and risks of offset failure.

US offset guidance calls for the incorporation of ecological values, but allows for offset transactions based on land area alone. For example, US conservation banking calls for credit units that reflect "a species' or habitat's conservation values," with these values based on biological criteria, habitat types, and management activities (US DOI 2003). However, this guidance also allows that "in its

simplest form, one credit will equal one acre of habitat or the area supporting one nest site or family group."

Likewise, US wetlands mitigation regulations require compensatory mitigation to be sufficient, to the extent practicable, to replace lost aquatic resource functions. The amount of compensatory mitigation should be determined based on a functional, condition, or other suitable assessment method. If one of these methods is not used, a minimum one-to-one acreage or linear foot compensation ratio must be used. Where necessary, mitigation ratios should be adjusted to greater than one-to-one based on the method of compensatory mitigation (e.g., preservation), likelihood of success, differences between functions lost and functions expected to be produced by the offset, temporal losses of aquatic resource functions, difficulty of restoring, establishing, or enhancing the desired aquatic resource type and functions, the distance between the affected aquatic resource and the offset site, and risk and uncertainty associated with offsets that have not been implemented before project impacts occur. The rationale for the required replacement ratio must be documented in the administrative record for the permit action

(33 C.F.R. § 332.3(f) [40 C.F.R. § 230.93(f)]).

With no regulatory endorsement of a specific functional or condition assessment method for wetlands mitigation, and a broad range of factors to consider in establishing mitigation ratios, several US states have simply established defined wetlands mitigation ratios based on the type of compensatory action. These can vary widely from state to state. For example, Ohio's ratio is 1-to-1 for wetlands restoration and creation and 2-to-1 for enhancement and preservation actions, whereas New Jersey's ratio is 2-to-1 for restoration actions and Michigan's ratio is 10-to-1 for preservation (Environmental Law Institute 2002). Brazil has taken a similar approach for forestry offsets, establishing a set mitigation ratio of 1-to-1 for all forestry offsets. For industrial offsets, Brazil requires a minimum payment of 0.5 percent of total capital costs of development to support offsets commensurate with impacts.

Whereas the other offset frameworks reviewed make no endorsement of a particular assessment method, guidance in Victoria, Australia supports a specific approach for determining offsets called the "habitat hectares" method (Parkes and others 2003), and this has also been adapted within the NSW Biobanking assessment methodology (NSW DECC 2008). The "habitat hectares" approach involves comparing remnant native vegetation to a benchmark for the same vegetation existing in a mature and long-undisturbed state. Based on an assessment of site conditions and the landscape context, component scores are developed as a basis for estimating the overall habitat quality, which is then multiplied by the area of the site to establish the number of habitat hectare units (Victoria DNRE 2002; Victoria DSE 2008).

Discussion

Our review of offset policy frameworks in the United States, European Union, Australia, and Brazil finds much consensus on offset goals, the importance of adhering to the mitigation hierarchy, and approaches for addressing key challenges to implementing offsets. While this congruence provides a sound foundation from which to develop policy for biodiversity offsets, several issues require further guidance, including how best to: (1) ensure conformance with the mitigation hierarchy; (2) identify the most environmentally preferable offsets within a landscape context; and (3) determine appropriate mitigation replacement ratios.

First, while offset frameworks emphasize the importance of the mitigation hierarchy—avoiding and minimizing impacts before proceeding to compensatory mitigation—there is little guidance on how this critical sequence should be followed to ensure projects conform to it. Guidance tends to focus on avoiding impacts to "difficult-to-replace" and "high significance" resources, but ultimately provides wide discretion to regulatory authorities on decisions about when to avoid, minimize, or offset. A chief concern about advancing biodiversity offsets is that, if not implemented according to the mitigation hierarchy and a set of standards, the approach could provide a "license to trash" —development in areas where impacts should have been avoided or more effectively minimized. To safeguard against this concern, more effective policy guidance is needed for determining whether projects conform to the mitigation hierarchy. Such guidance should incorporate science-based criteria—irreplaceability and vulnerability – as put forward under approaches by Kiesecker and others (2009a) and the NSW BioBanking scheme (see "Mitigation Hierarchy" discussion above).

Second, policy guidance on issues of equivalence and location is trending away from strict requirements for in-kind offsets located as close to impact sites as possible, in favor of identifying the most environmentally preferable offset options within the watershed or landscape. While these changes in policy could improve conservation outcomes, some further guidance in needed. For example: What criteria should be applied in determining when out-of-kind offsets represent a "trade up" in conservation benefits compared to in-kind options? To what extent are criteria and standards needed for watershed/landscape planning, to ensure more pro-active approaches to conservation-development conflicts and cumulative impacts? Within a watershed or landscape context, what approach should be taken for offsetting ecosystem service impacts, given that service benefits tend to be tied closely to location (e.g., non-timber forest products, water services) and people benefitting from such services are unlikely to find it

adequate compensation if offsets are located far from the impact site?

To address these issues, offset frameworks need to move beyond encouraging a landscape/watershed approach to making this planning a *requirement*, especially for landscapes where future impacts are projected to be significant. Incorporating landscape planning (e.g., Margules and Pressey 2000; Pressey and Bottril 2008) into mitigation decisions offers numerous advantages over a traditional project by project approach. Landscape plans allow practitioners to consider the cumulative impacts of current and projected development. This can guide which step of the mitigation hierarchy should be applied (i.e. avoidance versus offsets) and ensure that, rather than piecemeal activities, mitigation is consistent with broader conservation goals to maintain large, resilient ecosystems that support healthy wildlife habitats with sufficient connectivity and benefit human communities.

Harnessing landscape planning can also improve offset site selection and conservation returns. Kiesecker and others (2009b) propose adapting systematic conservation planning to identify offset opportunities in the highest priority areas for conservation. The approach involves developing a series of rules (offset goals) for selecting offset sites that would meet the conservation needs of impacted biological targets (i.e. size, condition, landscape context). Then using a site-selection algorithm (i.e. Marxan, Ball and Possingham 2000), offset sites that would best meet conservation goals are identified at increasing spatial extents. This is done from a landscape perspective, including consideration of landscape integrity and future potential impacts. Rules can be designed to ensure that the offset portfolio captures the necessary landscape-level conservation requirements, such as connectivity, corridors, and buffer zones of the intended conservation targets. From this portfolio of possible offsets, sites can then be selected for implementation that best support conservation goals.

Third, where offsets are implemented, policy guidance on mitigation replacement ratios is often inadequate. Broadly speaking, guidance on replacement ratios falls into three categories: (1) pre-defined ratios, such as those based on the type of conservation action (e.g., 1-to-1 ratio for restoration, 5-to-1 ratio for preservation); (2) ratios determined based on a specified assessment method (e.g., "habitat hectares"); and (3) subjectively determined ratios based on the discretion of regulatory authorities after multiple considerations, such as conservation actions, probability of success, temporal losses, and uncertainty and risk factors, among others.

All three approaches are problematic. While pre-defined ratios may simplify the offsets implementation process, there is little reason to believe they deliver no net loss outcomes on a regular basis. Given variations in ecosystems, types of impacts, and possible offsets, pre-defined ratios may result in under-compensation or over-compensation, but the achievement of no net loss outcomes is more likely coincidence than by design. To illustrate, consider two possible restoration offsets. The first offset involves the application of an untested restoration approach, and it will be many years before conservation values are delivered, if at all. The second offset uses a well-accepted restoration approach that can deliver conservation benefits effectively and rapidly. Under offset policies using pre-defined replacement ratios for restoration actions, the same ratio (typically a ratio of 1-to-1 for U.S. wetlands mitigation, but it varies across states) would be applied to both projects, despite the marked differences in likely conservation benefits.

Reliance on a single assessment method to determine ratios seems similarly inadequate for addressing the wide range of possible impacts and offset opportunities. Consider that for wetlands mitigation alone there are dozens of sophisticated assessment methods (Bartoldus 1999). These multiple assessment methods have been developed over time for a variety of reasons—to address different wetland types, in response to scientific advancements, and to meet demands for more practical, cost-effective, and timely assessments. Policies that endorse a specific assessment method are likely to constrain innovation and limit the potential for determining ratios that deliver no net loss outcomes.

Lastly, subjectively determined ratios based on professional judgment (of regulators and others) is too often an ad hoc and opaque process. This makes it difficult to ascertain the degree to which decisions are science-based and unbiased. Moreover, since the approach lacks a structured and transparent framework, it is often not time- and cost-efficient.

A more structured, transparent, and defensible accounting framework is needed that takes into account ecological context and other important factors. Our review suggests such a framework focus on three key offset elements: (1) "additionality" (the extent to which an offset provides a new contribution to conservation); (2) probability of success (the likelihood that offset actions will deliver expected conservation benefits); and (3) time-lag to conservation maturity (how long it will take for offset actions to deliver conservation at a maturity level similar to what was lost at the impact site).

A transparent framework with specific guidance on quantitative approaches for incorporating these three factors would be a significant improvement over current practices. For additionality, the framework should take current conditions and threats into account, using a baseline that reflects an expected background rate of loss for the

offset site. This would support quantitative estimates of additionality for both restoration *and* protection offsets, with protection benefits based on prevention of the expected background rate of loss.

Likewise, incorporating probability of success into offset accounting would ensure a more realistic appraisal of how restoration and protection offsets contribute to no net loss outcomes. The success of conservation actions can vary greatly, depending on the ecosystem, restoration techniques, management, and other factors. Where experience with conservation actions is comprehensive, probability of success can be estimated with some accuracy, and where experience is more limited, a ranking process might be employed (high, medium, low probability). Incorporating probability of success will create incentives for implementing effective offsets over offset actions with high risks of failure. It will also encourage offset planning that includes monitoring, legal and financial assurances, adaptive management, and other measures to increase an offset's estimated probability of success (as this will in turn increase the offset's value in the accounting framework).

Finally, it may take many years or decades before conservation actions reach maturity. This time-lag represents a loss for biodiversity; it should be accounted for in estimates of offset benefits (Moilanen and others 2008). This involves estimating the time to maturity of a conservation action and applying a discount rate – a commonly used method for estimating the present value of future benefits. This approach will create appropriate incentives for offsets, making conservation actions that promise benefits far into the future less attractive than offsets delivering more immediate benefits. Likewise, there will be strong incentives to avoid impacts to natural systems that require very long periods for restoration, as offsets for these impacts would likely have a very high replacement ratio, making them more expensive to implement.

Policy guidance on mitigation replacement ratios needs to be strengthened. We recommend an accounting framework that incorporates additionality, probability of success, and time to conservation maturity. A more quantitative approach would be a marked improvement over current practices, could help address concerns about offsets not providing sufficient compensation for losses (Race and Fonseca 1996; Ambrose 2000; National Research Council 2001), and would align incentives to support offsets that truly deliver on no net loss goals.

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Development by design: blending landscape-level planning with the mitigation hierarchy

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Development by design: blending landscape-level planning with the mitigation hierarchy

Joseph M Kiesecker[1*], Holly Copeland[2], Amy Pocewicz[2], and Bruce McKenney[3]

Compensatory mitigation, or biodiversity offsets, provide a mechanism for maintaining or enhancing environmental values in situations where development is being planned, despite detrimental environmental impacts. Offsets are generally intended as an option for addressing any remaining environmental impacts of a development plan, after efforts have been made to avoid, minimize, or restore on-site impacts. Although offset programs require that developers adhere to the mitigation hierarchy to avoid, minimize, and restore biodiversity on-site before considering an offset for residual impacts, no quantitative guidelines exist for this decision-making process. What criteria are needed to require that impacts be minimized or avoided altogether? Here, we examine how conservation planning can provide a way to address this issue. By blending landscape-level conservation planning with application of the mitigation hierarchy, we can ensure that the use of biodiversity offsets is consistent with sustainable development practices.

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There is widespread consensus that the world is currently experiencing a mass extinction event (Wilson 1992; Novacek and Cleland 2001). The biodiversity loss associated with this process is the result of several factors, including: land-use change and habitat destruction, invasive species, overexploitation of resources, pollution, and climate change. Of these factors, habitat destruction is by far the most detrimental, with infrastructure development playing a key role (Hardner and Rice 2002). It is estimated that an unprecedented US$22 trillion will be invested, to support increased infrastructure development by 2030, mostly in developing countries (IEA 2006; World Bank 2007). With the mounting pressure on natural resources as human populations grow, there is increasing urgency to find ways to balance these growing needs with those of biodiversity conservation.

Environmental impact assessment (EIA) is a systematic process that examines the environmental consequences of planned developments (Lawrence 2003). Since its inception in the US in 1969, the concept of EIA has spread worldwide.

In a nutshell:

- Balancing growing resource needs with biodiversity conservation requires an approach beyond traditional project-by-project mitigation for impacts resulting from development
- We show how conservation planning, in combination with the mitigation hierarchy, can guide decision making on where impacts to biodiversity can be offset and where they should be avoided or minimized
- This framework not only guides the use of mitigation strategies, but also provides a structure for funding conservation

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The emphasis of EIA is on prediction and prevention of environmental damage (Lawrence 2003). The mitigation of environmental impacts is therefore a key stage of the EIA process, and lies at its heart (Pritchard 1993). EIA practitioners seek to minimize impacts through the application of the "mitigation hierarchy": avoid, minimize, restore, or offset (CEQ 2000). In theory, this process provides a mechanism to balance development and conservation; however, in practice, EIA is applied on a project-by-project basis, which can underestimate the cumulative impacts of multiple current or projected development projects within an area and also limit flexibility in applying the mitigation hierarchy.

Offsets are an increasingly popular mechanism for achieving environmental benefits (Gibbons and Lindenmayer 2007), by providing a mechanism for maintaining or enhancing environmental values in situations where development is being planned, despite the fact that such development is likely to cause detrimental environmental impacts (ten Kate 2004). Biodiversity offsets seek to ensure that the inevitable negative environmental impacts of development are moderated by environmental gains, with the overall aim of achieving a net neutral or positive outcome (ten Kate 2004; McKenney 2005). Offsets are generally intended as an option for addressing any residual environmental damage, after efforts have been undertaken to avoid and minimize the impacts (Figure 1).

Although the potential benefits of biodiversity offsets are numerous – including benefits for industry, government, and conservation groups alike – establishing offsets involves overcoming several conceptual and methodological challenges. A major problem with this approach is that it implies that all habitats can be offset. A key question concerning the use of offsets therefore centers on when and where they can be used as an appropriate tool. If offset use continues to increase, how do we know that impacts to

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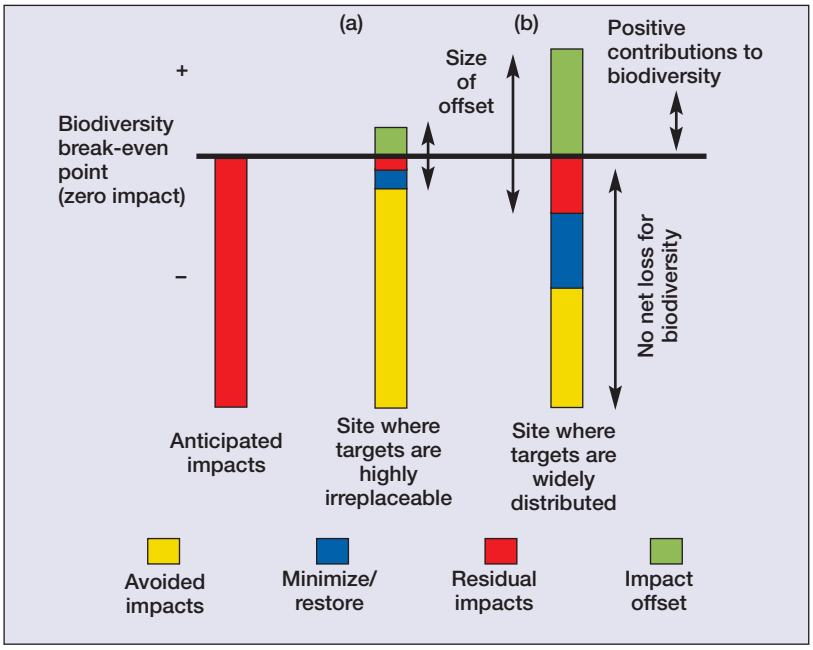

Figure 1. *Site-level mitigation recommendations resulting from a landscape-level plan. Impacts and mitigation to biodiversity are represented here for two examples, each occurring in areas where a landscape-level plan would recommend different mitigation options. (a) Proposed development at a site (ie Flaming Gorge) where targets are irreplaceable, necessitating a greater reliance on the use of avoidance and/or minimization. (b) Proposed development at a site (ie Calamity Ridge) where targets are widely distributed and/or highly conserved.*

biodiversity will continue to be offset? Regulatory agencies often require that developers follow the mitigation hierarchy (CEQ 2000) of seeking to avoid, minimize, and restore biodiversity on the site, before considering an offset for the residual impacts. However, no quantitative guidelines exist to guide this decision-making process.

Conservation planning (eg Groves 2003) provides a framework to ensure that mitigation efforts are consistent with conservation goals; this often includes the maintenance of large, resilient ecosystems to support both healthy wildlife habitats and human communities. Blending the mitigation hierarchy with conservation planning offers three distinct advantages over a traditional project-by-project approach. The mitigation-planning combination (1) takes into account the cumulative impacts of current or projected development projects; (2) provides regional context to better guide which step of the mitigation hierarchy should be applied (ie avoidance versus offsets); and (3) offers increased flexibility in choosing offsets that maximize conservation returns, by providing resources for the most threatened ecosystems or species.

Systematic conservation planning

Landscape-level conservation planning is the process of locating, configuring, and maintaining areas that are managed to maintain viability of biodiversity and other natural features (Pressey and Bottrill 2008). A conservation portfolio (composed of priority sites), the end product of conservation planning, is made up of a selected set of areas that represent the full distribution and diversity of these systems (Noss *et al.* 2002). Plans often optimize (Ball and Possingham 2000) the design of the portfolio to meet the minimum viability needs of each biological target, but in a way that minimizes the area required (Pressey *et al.* 1997; Ball and Possingham 2000). Thus, even though areas outside of the portfolio have not been selected, they may still help to meet biodiversity goals. The key feature of a conservation plan is the clear articulation of a biodiversity vision that incorporates the full range of biological features, how they are currently distributed, and what minimum viability needs each biological target requires to persist in the long term (Lovejoy 1980; Armbruster and Lande 1993; Doncaster *et al.* 1996). The creation of this vision and the implementation of the conservation strategy depend on the active involvement of host governments, experts from many disciplines, development organizations, and local residents. The ultimate goal is a peer-reviewed conservation strategy with specific action plans that are widely embraced and implemented by stakeholders.

Mitigation planning

We envision two ways in which conservation plans could be used to guide the application of the mitigation hierarchy. First, where plans have already been completed, proposed developments can be mapped and assessed relative to the conservation portfolio and the minimum viability needs of the target species. Overlap between the portfolio and the proposed development may result in a "redrawing" of the portfolio to recapture habitat needed to meet biodiversity goals impacted by development. However, if minimum viability needs cannot be met elsewhere within the study area, the development plans would need to minimize impacts to the degree that maintains the viability of the biological targets or development should not proceed (Figures 1 and 2). Second, where future development activities (eg oil and gas development, wind/solar development, residential development, some types of mining) can be estimated, these projections can be either mapped in association with an existing portfolio or used as part of the creation of a new conservation plan (Figure 2). The portfolio should be designed to avoid conflict with potential development. Areas where such projects could hinder conservation goals would again be identified and examined in greater detail and categorized as "avoidance/minimization" areas, as needed. If adopted, this framework would provide an opportunity to avoid conflict between potential development and areas that are

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critical for biodiversity conservation, and provide a structured framework to guide decisions regarding which step in the mitigation hierarchy should be applied (Figures 1 and 2).

Landscape-level plans can also maximize the benefits to conservation of applying the mitigation hierarchy, in particular where offsets are used. Most biodiversity offset legislation and policies presume "like-for-like" or "in-kind" offsets (ie offsets that conserve biodiversity of a similar kind to that affected by the development). At times, however, better conservation results may be obtained by placing the offset in an ecosystem of higher conservation priority. A regional landscape perspective can provide opportunities for identifying situations where "trading up", or "out-of-kind" offsets may offer valuable alternatives. Consider, for example, development that results in impacts to a widely distributed or highly conserved target. Requiring in-kind offsets could limit the potential benefit that an offset might provide. For example, losses of a particular common habitat type could be offset in a habitat of higher priority in the region, because it is under great threat (ie vulnerable) or because it is the last remaining example of its kind, and is therefore irreplaceable. Out-of-kind offsets may also be preferable where there is an opportunity to take advantage of existing conservation management to locate the offset, or consolidating several offsets in one location. Of course, alternatives to strict in-kind criteria would need to be clearly beneficial to biodiversity conservation or might only be adopted after proper consideration of an in-kind offset, and should not simply be driven by cost reduction.

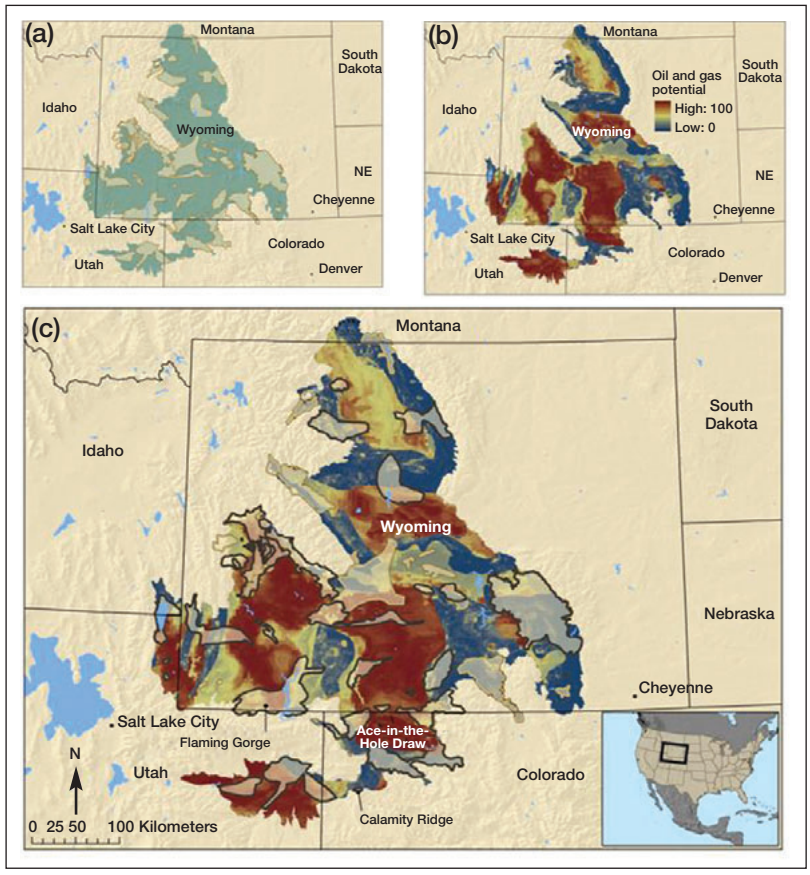

Figure 2. *Landscape-level recommendations for the application of the mitigation hierarchy in the Wyoming Basins ecoregion. (a) Portfolio of conservation sites selected by the Wyoming Basins ecoregional assessment (Freilich* et al. *2001). (b) Oil and gas potential, based on estimates of undiscovered, technically recoverable resources (US DOI 2006; Copeland* et al. *2007; Kiesecker* et al. *2009; Copeland* et al. *in review). (c) Sites that overlap areas with high probability of development outlined in black. Labeled sites – Ace-in-the-Hole Draw, Calamity Ridge, and Flaming Gorge – are discussed in more detail in the text.*

The Wyoming Basins ecoregion: a case study in mitigation planning

The Wyoming Basins ecoregion (WBE) comprises 13.3 million hectares of basin, plain, desert, and "island" mountains in Wyoming, Montana, Idaho, Colorado, and Utah (Bailey 1995; Figure 3). The area is a stronghold for the greater sage-grouse (*Centrocercus urophasianus*), an emblematic native game bird now being considered for listing under the Endangered Species Act (Figure 4). The ecoregion provides critical habitat for migratory big game, songbirds, and raptors within the reaches of the Greater Yellowstone ecosystem. Some of the world's largest herds of mule deer (*Odocoileus hemionus*) and pronghorn antelope (*Antilocarpa americana*) winter here, relying on the snow-free forage to get them through harsh winter weather (Figure 5). In an attempt to identify areas that would maintain long-term persistence of representative biodiversity for the ecoregion, The Nature Conservancy, together with key state and federal land management and wildlife regulatory agencies, universities, and other conservation organizations, set out to conduct an ecoregional plan for the WBE (Freilich *et al.* 2001). The portfolio of sites chosen during the WBE ecoregional assessment totals 3.5 million ha, or 27% of the total area in the ecoregion (Figure 2a). The WBE is also home to some of the richest oil and gas deposits in the western US (US DOI 2006; Figures 2b and 5), including some that intersect areas selected in the ecoregional assessment (Figure 2c). In fact, the number of producing oil and gas wells in the ecoregion has nearly tripled since the 1980s and is expected to increase further over the next 30 years (Copeland *et al.* 2007; Doherty *et al.* in press). Conservation of the biological diversity in this area is in question, in part because the US Federal Government has authorized exploration and development on over 4 million of the 8 million ha (52%) of the federal mineral estate within the ecoregion (Doherty *et al.* in press).

Here, we use the portfolio of sites selected in the plan (Freilich *et al.* 2001; Figure 2a) to demonstrate how we can

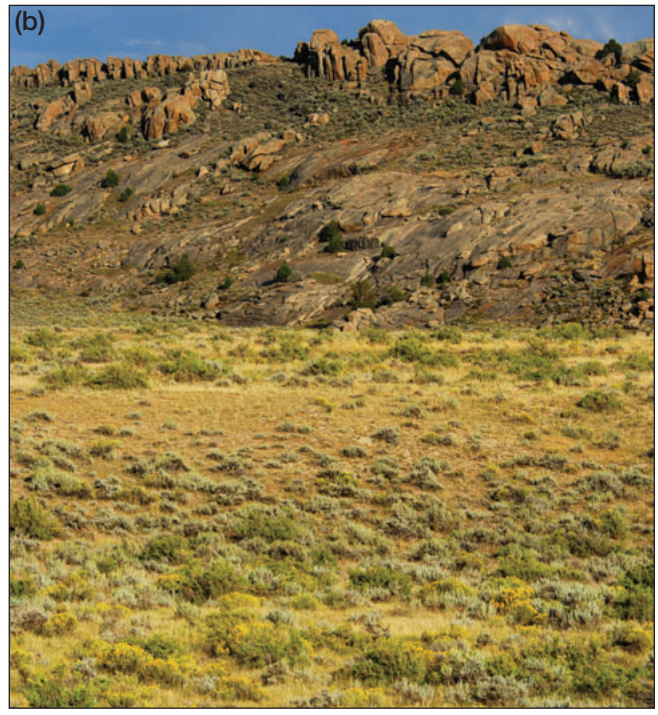

Figure 3. *Scenes from the Wyoming Basins ecoregion. (a) Killpecker Sand Dunes, Sweetwater County, Wyoming. (b) Sage brush community, Natrona County, Wyoming.*

apply the mitigation hierarchy to balance conservation objectives with impacts associated with future oil and gas development. Given that only 27% of the ecoregion was selected as part of the conservation portfolio, conflicts could potentially be resolved by simply redesigning the portfolio to meet the minimum viability needs of the biological targets in areas with lower oil and gas potential (Figure 2c; WebTable 1). We examined the intersection between these conservation areas and the land with the highest 25% of oil and gas potential, based on estimates of undiscovered, technically recoverable resources (US DOI 2006; Copeland *et al.* 2007; Kiesecker *et al.* 2009; Copeland *et al.* in review). A total of 27 conservation areas intersect with areas considered to have high development potential (Figure 2c). Sites would receive different mitigation recommendations, depending on the nature and distribution of conservation targets that the sites attempted to conserve. In our example, 22 of the 27 sites could use offsets to mitigate impacts resulting from development (WebTable 1). Of these 22 sites, nine have target goals that could be met completely elsewhere. For example, the Calamity Ridge site, located in northwestern Colorado, contains four widespread ecological systems (as per Freilich *et al.* 2001) for which goals could be met by substituting areas with low oil and gas potential currently outside of the portfolio. Eight of the 22 sites where offsets could be employed have localized occurrences of rare plants or animals that overlap with high oil and gas development potential. After attempts are made to avoid and/or minimize impacts to these target species, the remaining impacts could be offset. For example, the Ace-in-the-Hole Draw site contains only one rare plant (Nelson's milkvetch, *Astragalus nelsonianus*) that is critical in meeting ecoregional goals. As a first step, direct disturbance to the rocky outcrops and highly saline soils that serve as habitat for Nelson's milkvetch should be avoided and indirect impacts of development (ie spread of invasive plants) minimized. Second, any unavoidable impacts to the three ecological systems also present within the site could be offset. The remaining five sites where offsets could be used also have localized occurrences of rare plants or animals, but these occurrences do not overlap with high oil and gas development potential; therefore, unavoidable impacts to the widespread ecological systems found in these sites can be offset.

At the sites where conflicts can be resolved, development could proceed with a greater degree of flexibility in applying the mitigation hierarchy, so that residual impacts are managed through the use of on-site restoration and offsets (Figure 1). For example, a development proposed within the Calamity Ridge site that would result in residual impacts to its ecological systems could be offset. Applying the "no-net-loss" concept, as prescribed by Kiesecker *et al.* (2009), to impacts associated with development at this site and offsetting any residual impact would be consistent with the ecoregional goals. Moreover, the ecoregional perspective provides the opportunity to maximize offset benefits. Because irreplacability scores can be calculated for each biological target across the ecoregion (Ferrier *et al.* 2000), decisions regarding offsets can maximize benefits when made at this scale. For example, consider impacts to juniper woodlands at the Calamity Ridge site. Offsets could be directed at other juniper woodlands (in-kind offsets) or directed toward targets of greater conservation value (out-of-kind offsets). Juniper woodlands are widespread, highly conserved, and occur in areas not judged to be at great risk (Freilich *et al.* 2001; Copeland *et al.* 2007), so that directing offsets at targets considered to be irreplaceable (ie sagebrush systems) will result in a higher conservation return.

In sites containing irreplaceable targets, however, greater emphasis will be given to avoidance or minimization (WebTable 1). For example, of the 27 sites that overlap areas of high development potential, five contain occur-

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rences of both rare plants and animals that are critical to meeting ecoregional goals and are distributed across most of the site. This means that avoidance or minimization strategies should be considered, in order to maintain viability of the target species. The Flaming Gorge site, located in southwestern Wyoming, contains 37 separate rare plant targets, 20 rare animal targets, and 27 individual ecological systems. The site is critical to meeting the ecoregional goals involving six of the rare plants – Uinta greenthread (*Thelesperma pubescens*), Cedar Mountain easter daisy (*Townsendia microcephala*), Wyoming tansy mustard (*Descurainia torulosa*), Green River greenthread (*Thelesperma caespitosum*), Nelson's milkvetch (*Astragalus nelsonianus*), and Uinta draba (*Draba juniperina*) – and three of the rare animals – roundtail chub (*Gila robusta*), flannelmouth sucker (*Catostomus latipinnis*), and bluehead sucker (*Catostomus discobolus*). These target species are critical, as they are extremely rare (often 5–20 known populations), are experiencing very steep population declines, or face other factors that place them at risk. Because there is limited flexibility in where these target species can be conserved, impacts in this site would make meeting ecoregional goals difficult. Proposed developments at these sites would either be rejected or could only proceed if combined with efforts to minimize impacts, leaving little or no residual impact (Figure 1).

Mitigation funding fuels conservation

Offsets represent an opportunity to mobilize billions of dollars for conservation (McKenney 2005; Burgin 2008). When mitigation is a normal part of project costs, the level of funding available for conservation can greatly exceed other funding sources. For example, in Wyoming, $24.5 million was established as a mitigation fund for a single oil and gas field; compare this to the $4 million available for wildlife conservation from the Wyoming Wildlife and Natural Resource Trust (Kiesecker *et al.* 2009). Although this was the first application of offsets associated with oil and gas development in the WBE, the Bureau of Land Management, which oversees the management of over 260 million acres of land in the US, and administers the mineral estate for over 700 million acres, has recently adopted a change to its offset policy and now allows projects to include offsets associated with impacts resulting from development (US BLM 2008). Given the extensive amount of oil and gas development projected for the WBE, a requirement that development projects achieve no-net-loss could be the impetus that is needed to conserve biodiversity across the ecoregion as well as other energy-rich ecoregions. This may be important, as the US moves to exploit more of its domestic energy resources, in particular renewable energy. Internationally, several countries (eg Australia, Brazil, South Africa, and Colombia) are developing policies to improve the mitigation process by making planning more proactive and by including offsets as a stronger component for mitigating impacts (Gibbons and Lindenmayer 2007; Burgin 2008).

Figure 4. *Greater sage-grouse (*Centrocercus urophasianus*), a sagebrush obligate now under consideration for listing under the Endangered Species Act.*

Conclusions

Predictions suggest that there will be increasing pressure on natural resources as human populations grow (World Bank 2007). In order to balance these growing demands with biodiversity conservation, a shift from "business as usual" is clearly needed. By blending a landscape vision with the mitigation hierarchy, we move away from the traditional project-by-project land-use planning approach. By avoiding or minimizing impacts to irreplaceable biological targets and then ensuring that damaged ecosystems are restored on site, using the best available technology, and finally offsetting any remaining residual impacts, we can provide a framework that is consistent with sustainable development (Pritchard 1993; Bartelmus 1997). A landscape vision is essential, because it helps us to move beyond a business-as-usual approach to conservation. It ensures that the biologically

Figure 5. *Pronghorn antelope (*Antilocarpa americana*) in a Wyoming Basins gas field. Part of the greater Yellowstone ecosystem, the Wyoming Basins ecoregion contains some of the world's largest herds of mule deer (*Odocoileus hemionus*) and pronghorn.*

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and ecologically important features remain the core conservation targets throughout the process. Without this vision, the overarching conservation targets are lost, prioritization becomes difficult, and scarce resources are wasted. Determining appropriate areas to preserve as habitat, as part of a conservation plan, is a challenging exercise; however, in reality, this is the easy part. The real challenge is identifying funding mechanisms to underwrite the conservation of these areas. By adopting the approach outlined here and requiring the application of the no-net-loss framework (Kiesecker *et al.* 2009), not only do we balance development with conservation, but we also provide the funding to support conservation commensurate with impacts from development.

To see the benefits of a comprehensive approach to mitigation we need look no further than at existing oil and gas development in the WBE. If a landscape-level plan had been used, this might have included recommendations to avoid or minimize impacts from the ten gas fields currently in production within the Flaming Gorge site. Out of more than 550 individual fields and 31 750 producing oil and gas wells in the WBE, the developers of only one field have been required to include offsets to mitigate for impacts. Although most individual fields do not represent substantial impacts, the cumulative damage is considerable, with a combined footprint of over 300 000 acres. If the no-net-loss goal had been required as part of each of these developments and offsets used to mitigate impacts where appropriate, the development that has already occurred could have resulted in a substantial benefits to conservation.

Acknowledgements

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WebTable 1. Portfolio sites from the Wyoming Basins Ecoregional Assessment that overlap with high oil and gas potential

Portfolio site	*Size (acres)*	*Area with high oil and gas potential*	*Conservation targets*			*Mitigation recommendation*
			Ecological systems	*Rare animals*	*Rare plants*	
Ace-in-the-Hole	1283	1235	x		x	Offset after Avoid/minimize impacts to rare plants
Bear Lake	188 061	36 570	x	x	x	Avoid/minimize
Calamity Ridge	7825	4447	x			Offset
Cherokee Basin	309 302	100 569	x	x	x	Offset after Avoid/minimize impacts to rare animals and plants
East Cody	66 671	2223	x	x	x	Offset
Ferris Mountain	33 804	4942	x	x	x	Offset
Flaming Gorge	716 947	192 985	x	x	x	Avoid/minimize
Flat Top Mountain	4908	667	x		x	Offset after Avoid/minimize impacts to rare plants
Green Mountains	23 767	1235	x		x	Offset
Greybull River Basin	317 387	16 308	x	x	x	Offset
Lower Green River	505 129	250 065	x	x	x	Avoid/minimize
Muddy Creek Basin	180 281	247	x	x		Offset
No Wood River	287 281	47 690	x	x	x	Offset
Overthrust Belt	431 830	124 291	x	x	x	Offset after Avoid/minimize impacts to rare plants
Pine Butte	83 129	94 639	x	x	x	Offset, area of potential impact does not overlap with targets of concern
Red Desert	34 302	17 888			x	Offset
Seedskadee	40 405	5436	x	x	x	Avoid/minimize
Shirley Basin	1 356 701	12 602	x	x	x	Offset, area of potential impact does not overlap with targets of concern
Sugarloaf	187 929	17 791	x	x	x	Offset after Avoid/minimize impacts to the one rare plant
Sweetwater River	997 775	141 094	x	x	x	Offset, area of potential impact does not overlap with targets of concern
Table Mountain	8935	8895	x	x	x	Offset
Uinta Benches	161 909	149 495	x	x	x	Offset after Avoid/minimize impacts to rare plants

continued

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WebTable 1. – *continued*

Portfolio site	Size (acres)	Area with high oil and gas potential	Conservation targets: Ecological systems	Rare animals	Rare plants	Mitigation recommendation
Upper Green River	473 708	254 760	x	x	x	Avoid/minimize
Walton Canyon	7180	6918	x	x	x	Offset after Avoid/minimize impacts to rare animals
Western Wind River	607 425	73 141	x	x	x	Offset, areas of potential impact do not overlap with rare targets
Wind River Canyon	409 386	26 192	x	x	x	Offset, areas of potential impact do not overlap with targets of concern
Yampa River	528 690	85 496	x	x	x	Offset after Avoid/minimize impacts to rare animals

Notes: Included are the sizes of the sites, areas of high oil and gas potential within the sites, conservation targets within the sites (ecological systems, rare animals, and rare plants, as defined in Freilich *et al.* 2001) and mitigation recommendation. Complete target lists are provided for the three sites used as examples: **Ace-in-the-hole Draw targets:** *Ecological systems* (Basin big sage, Gardner saltbush flats, juniper woodland). *Rare plants* (Nelson's milkvetch). **Calamity Ridge targets:** *Ecological systems* (deciduous oak, Basin big sage, juniper woodland, pinyon–juniper woodland). **Flaming Gorge targets:** *Ecological systems* (foothills grassland, mixed grass prairie, mesic upland shrub, deciduous oak, mountain mahogany shrubland, Wyoming big sage, mountain big sagebrush, Basin big sage, black sage, salt desert scrub, Gardner saltbush flats, greasewood, aspen, sub-alpine forest, ponderosa pine, lodgepole pine, mountain fir, limber pine, juniper woodland, pinyon–juniper woodland, aspen/conifer forest riparian, grass riparian, and meadow shrub-dominated riparian wetland, barren). *Rare animals* (Uinta ground squirrel, black-footed ferret, white-tailed prairie dog, Idaho pocket gopher, ferruginous hawk, burrowing owl, sage grouse, roundtail chub, pygmy rabbit, flannelmouth sucker, peregrine falcon, dwarf shrew, Virginia's warbler, northern plateau lizard, northern tree lizard, midget faded rattlesnake, bluehead sucker, and important bat roosts). *Rare plants* (Crandall's rockcress, Daggett rockcress, Selby rockcress, Moab milkvetch, Starveling milkvetch, Nelson's milkvetch, precocious milkvetch, fullstem Ownbey's thistle, erect cryptantha, Echo spring-parsley, Wyoming tansy-mustard, Uinta draba, single-stemmed wild buckwheat, Utah greasebush, compact gilia, Watson's prickly-phlox, narrowleaved bladderpod, tufted cryptanth, Rollins cryptanth, Maybell locoweed, stemless beardtongue, Sheep Creek beardtongue, Payson beardtongue, Garrett's beardtongue, desert glandular phacelia, western phacelia, opal phlox, persistent sepal yellowcress, *Sphaeromeria argentea, Sphaeromeria capitata*, Green River greenthread, Uinta greenthread, Cedar Mountain easter daisy).

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A Framework for Implementing Biodiversity Offsets: Selecting Sites and Determining Scale

JOSEPH M. KIESECKER, HOLLY COPELAND, AMY POCEWICZ, NATE NIBBELINK, BRUCE McKENNEY, JOHN DAHLKE, MATT HOLLORAN, AND DAN STROUD

Biodiversity offsets provide a mechanism for maintaining or enhancing environmental values in situations where development is sought despite detrimental environmental impacts. They seek to ensure that unavoidable negative environmental impacts of development are balanced by environmental gains, with the overall aim of achieving a net neutral or positive outcome. Once the decision has been made to offset, multiple issues arise regarding how to do so in practice. A key concern is site selection. In light of the general aim to locate offsets close to the affected sites to ensure that benefits accrue in the same area, what is the appropriate spatial scale for identifying potential offset sites (e.g., local, ecoregional)? We use the Marxan site-selection algorithm to address conceptual and methodological challenges associated with identifying a set of potential offset sites and determining an appropriate spatial scale for them. To demonstrate this process, we examined the design of offsets for impacts from development on the Jonah natural gas field in Wyoming.

Keywords: biodiversity offsets, mitigation hierarchy, no net loss, Marxan site selection

Between one-third and one-half of Earth's land surface has been altered by human action (Vitousek et al. 1997), resulting in an unprecedented loss of biodiversity. As a result, some 10 to 30 percent of all mammal, bird, and amphibian species are threatened with extinction (Levin and Levin 2004, Kiesecker et al. 2004). Looking forward, such impacts could increase dramatically: the global economy is expected to double by 2030 (World Bank 2007), and unprecedented investments are being made in resource development to support this growth, especially in developing countries (IEA 2007). Given the importance of economic development for improving human well-being, there is greater pressure to find ways to balance the needs of development with those of biodiversity conservation.

Biodiversity offsets are one important tool for maintaining or enhancing environmental values in situations where development is sought despite detrimental environmental impacts (ten Kate et al. 2004, McKenney 2005, Gibbons and Lindenmayer 2007). Offsets are intended to be an option for addressing environmental impacts of development after efforts have been undertaken to minimize impacts on-site through application of the three other steps of the mitigation hierarchy: avoid, minimize, restore (40 C.F.R. 1500.2). They seek to ensure that inevitable negative environmental impacts of development are balanced by environmental gains, with the overall aim of achieving a net neutral or positive outcome (see figure 1).

Offset policies for environmental purposes have gained attention in recent years (e.g., Environmental Defense Fund 1999, Government of New South Wales 2003; see McKenney 2005 for a review). Although the use of offset activity remains relatively limited, offsets are increasingly employed to achieve environmental benefits, including pollution control, mitigation of wetland losses, and protection of endangered species (ten Kate et al. 2004, McKenney 2005). Offset activity is most active for US wetlands, where methods and programs have been under development for the past two decades. Wetland offsets in the United States have increased dramatically, with 6000 hectares (ha) per year in the early 1990s growing to an average of more than 16,000 ha per year since 1995 (Environmental Law Institute 2002). Offset programs have also been established or are developing in other parts of the world, including Australia, Brazil, and the European Union (McKenney 2005, Gibbons and Lindenmayer 2007).

Offsets offer potential benefits for industry, government, and conservation groups alike (ten Kate et al. 2004). Benefits for industry include a higher likelihood that permission will be granted from regulators for new operations, greater

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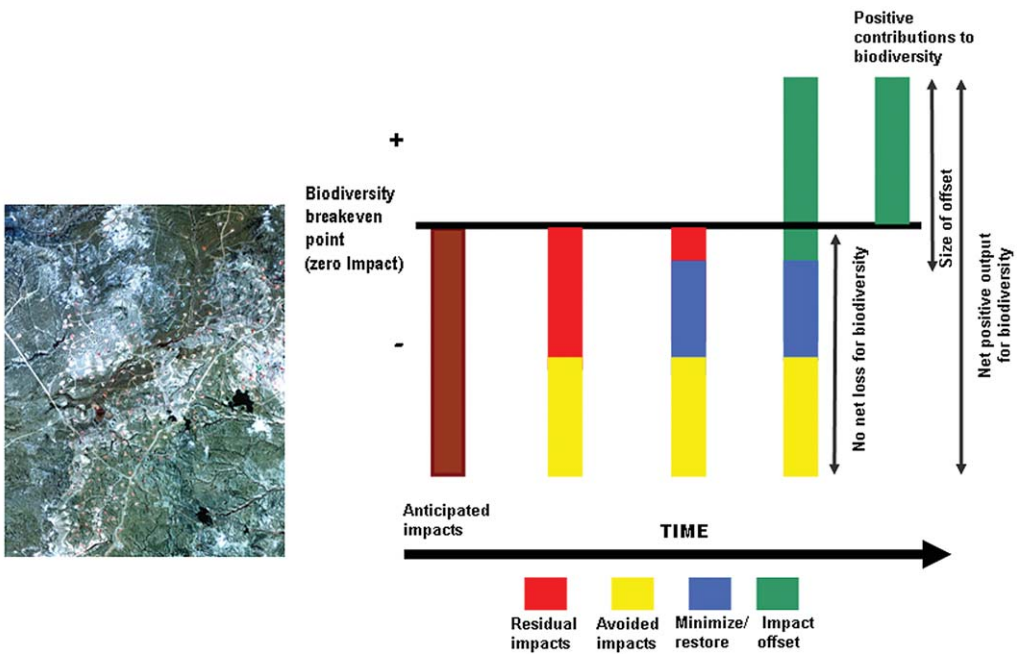

Figure 1. The role of offsets in achieving no net loss (or better) for biodiversity. Impacts to biodiversity are represented here as surface disturbance. Avoided impacts to the project area are in accord with the surface disturbance cap of 5677 hectares (ha), or 46 percent of the project area. Additional surface disturbance will be minimized through the use of drilling mats on 25 percent of the 3100 wells. Wells in the Jonah Field are projected to result in approximately 1.6 ha of surface disturbance per well. Drilling mats reduce approximately 0.81 ha of surface disturbance, resulting in a reduction in approximately 627 ha or about 5 percent reduced surface disturbance. We estimated about 5 percent residual surface disturbance would remain after production activities ceased and restoration was completed in 30 to 50 years. The size of the offset (17,031 hectares) was based on an estimated 3 to 1 ratio of on-site impact to offset (USDOI 2006). The inset is an aerial view of the Jonah Field taken before the infill project that prompted the offset requirement (image courtesy of NASA/GSFC/METI/ERSDAC/JAROS and the US/Japan ASTER Science Team).

societal support for development projects, and the opportunity to more effectively manage environmental risks. Offsets provide governmental regulators with the opportunity to encourage companies to make significant contributions to conservation, particularly when legislation does not require mandatory offsets. Conservation organizations can use biodiversity offsets to move beyond piecemeal mitigation, securing larger-scale, more effective conservation projects. Offsets can also be a mechanism ensuring that regional conservation goals are integrated into governmental and business planning.

Although offsets have great potential as a conservation tool, their establishment requires overcoming a number of conceptual and methodological challenges (Burgin 2008). One of the key questions is how offsets should be located relative to the affected site. When on-site impacts warrant the use of offsets, there is often a tension between choosing sites as close to the impact site as possible (ensuring that benefits accrue to the same area) and choosing sites likely to provide the greatest conservation benefit (with less regard to spatial position). To date, no one has found a way to determine appropriate distances for offsets. Here we propose a framework to address this need. Our proposed framework for offset site selection includes two major components. First, we develop a series of rules (offset goals) for selecting offset sites that meet the conservation needs of potentially affected biological targets (i.e., size, condition, landscape context). Next, we use a site-selection algorithm developed for Marxan (Ball 2000, Ball and Possingham 2000, Possingham et al. 2000) to search for sites at increasing spatial extents. Offset sites can then be chosen from the closest extent at which impact goals are met.

Our objective is to design an approach ensuring that offsets are ecologically equivalent to impact sites and will persist at least as long as on-site impacts, and that they will achieve net neutral or positive outcomes. We propose five steps for this approach: (1) assemble a working group, (2) compile a list of representative biological targets, (3) gather spatial data for biological targets, (4) set impact goals for each biological target, and (5) use the Marxan algorithm at increasing spatial extents to identify potential offset sites. To demonstrate the approach, we present a case study from the Jonah natural gas field located in southwestern Wyoming. British Petroleum, one of the principal operators on the field, expressed the need for a structured framework to guide the disbursement of mitigation funds and invited the Nature Conservancy to design such a plan.

Study area description: Jonah natural gas field

Located in Wyoming's Upper Green River Valley, the 24,407-ha Jonah natural gas field is considered one of the most significant natural gas discoveries in the United States in recent times, with an estimated 7 trillion to 10 trillion cubic feet of natural gas (USDOI 2006). During the last 10 years, the field has become one of the nation's richest gas fields, currently with approximately 500 wells. The Bureau of Land Management (BLM) granted regulatory approval in 2006 to infill the existing 12,343-ha developed portion of the field with an

additional 3100 wells (USDOI 2006). As a requirement of the infill project, an off-site mitigation fund of $24.5 million dollars was established (USDOI 2006).

The Jonah Field is located in a high-desert sagebrush ecosystem that provides critical habitat for migratory big game, songbirds, and raptors, within the southern reaches of the Greater Yellowstone Ecosystem. Some of the world's largest herds of large game species (pronghorn antelope, *Antilocarpa americana*) winter here, relying on the valley's snow-free forage to get them through harsh winter weather. Migratory pathways lace the area, connecting the winter range with alpine terrain in five nearby mountain ranges. This area is also a stronghold for the greater sage-grouse (*Centrocercus urophasianus*), an emblematic native game bird now being considered for listing under the Endangered Species Act. Because wildlife in the field had already incurred significant impacts before the infill (TRC Mariah Associates Inc. 2004), off-site mitigation was considered an appropriate tool for the anticipated additional disturbance.

Assembling a working group

A mitigation-design working group was formed to guide development of the process of offset designation and integration of spatial data into the site selection process. All participants had expertise and involvement with the biological systems affected by the Jonah Field development; the group included representatives from state agencies (Wyoming Game and Fish Department, Wyoming Department of Environmental Quality), federal agencies (BLM, US Fish and Wildlife Service), universities, biological consulting firms, and the local agricultural production community. This group helped secure the most current spatial data on species of concern, assessments of the predictive models being developed, and insights into the process being developed. We sought to apply rigorous, objective measures of conservation value whenever possible, recognizing that a quantitative assessment would have to be supplemented by expert opinion.

Compiling a list of representative biological targets

Biological diversity cannot easily be completely and directly measured. Thus, practitioners are forced to select a set of components of biological diversity that can be measured effectively, given existing resources, components that adequately represent the range of biological phenomena in the project area and contribute the most to the overall biological diversity of a project area. Selecting a set of focal targets with sufficient breadth and depth can be done through the coarse-filter/fine-filter approach, as applied, for example, in ecoregional planning by the Nature Conservancy (TNC 2000). "Coarse filter" generally refers to ecosystems; in a more practical sense, it refers to mapped units of vegetation. The basic idea is that conserving a sample of each distinct vegetation type, in sufficient abundance and distribution, is an efficient way to conserve the majority of biological phenomena in the target area. An oft-cited statistic is that coarse-filter conservation will conserve 80 percent of all species in a target area (Haufler et al. 1996). "Fine filter" generally refers to individual species with specific habitat requirements or environmental relationships that are not adequately captured by the coarse filters. Narrow endemic species and extreme habitat specialists, species with restrictive life histories, or those species that have lost significant habitat or are particularly sensitive to human perturbations fall into this category (i.e., IUCN Red List species).

The Nature Conservancy's ecoregional planning uses both coarse- and fine-filter guidelines to identify biological targets. Therefore, for our case study we used the biological target list from the Wyoming Basins Ecoregional Plan (Freilich et al. 2001) crosswalked with information gathered as part of the environmental impact assessment (EIA; USDOI 2006). We selected all ecoregional conservation targets identified within the bounds of the field area as a biological target to be included in the offset design. We selected nine species and one ecological system to represent the biodiversity on the Jonah Field (table 1).

Table 1. Information on targets selected to represent biodiversity on the Jonah natural gas field.

Biological target	Impact goal (hectares)	Data source	Assessment goals met at smaller scale?	Assessment goals met at larger scale?
Burrowing owl	13,690	Deductive model	No	Yes
Cedar-rim thistle	3433	Inductive model	No	Yes
Mountain plover	1390	Deductive model	Yes	Yes
Pronghorn migration routes	7738	Wyoming Game and Fish linear data	Yes	Yes
Pygmy rabbit	7436	Deductive model	Yes	Yes
Sage grouse leks	6	Wyoming Game and Fish point data	Yes	Yes
Sage grouse winter habitat	21,043	Deductive model	Yes	Yes
Sage sparrow	8813	Deductive model	No	Yes
White-tailed prairie dogs	1705	Deductive model	Yes	Yes
Wyoming big sagebrush steppe	22,573	US Forest Service Landfire data	Yes	Yes

Note: Small-scale assessment goals come from analyses for the Pinedale Bureau of Land Management Field Office Boundary; larger-scale assessment goals come from analyses for the Wyoming Landscape Conservation Initiative Boundary.

Spatial data for biological targets

Spatial data were used to quantify impacts associated with development on the Jonah Field and to guide selection of offset sites. We used a combination of point survey data, vegetation cover estimations, and predictive model estimations (table 1). If survey data were sufficient for estimating occurrence patterns, we relied on these data. For example, for pronghorn, we created one-kilometer buffers (Berger et al. 2006) around linear pronghorn migration routes from the Wyoming Game and Fish Department (WGFD 2006). To estimate occurrence patterns of the Wyoming Big Sagebrush Steppe community, we relied on the US Forest Service's Landfire project data of existing vegetation height, type, and percentage cover (USFS 2006).

If survey data were insufficient to estimate occurrence patterns across the study area, we developed predictive models based on species occurrence, observation, and survey data from the Wyoming Natural Diversity Database, Wyoming Wildlife Consultants, Wyoming Game and Fish Department, and the BLM. We initially tried using an inductive modeling approach by developing a CART (classification and regression tree) model (Breiman et al. 1984) with the random forests algorithm through a GIS (geographic information system) tool developed at the University of Georgia called the EDM (element distribution modeling) Tools for ArcGIS (Nibbelink 2006), but our expert biologists were dissatisfied with the models we produced—the models lacked sufficient survey data to generate adequate models. As an alternative, we settled on a simpler approach using deductive models, wherein we identified each species' habitat preferences and created binary models of suitable habitat through a series of GIS overlays based on slope; aspect; topographic roughness; elevation (digital elevation models); stream buffers; and vegetation type, height, and percentage cover. The topographic features (elevation, aspect, slope, roughness) were all derived from the 30-meter National Elevation Dataset assembled by the US Geological Survey (USGS). Vegetation data were obtained from Landfire (USFS 2006), and streams data were based on the National Hydrologic Dataset (USGS 1997). To convert aspect to a continuous linear data set, we calculated the cosine of the aspect multiplied by –100 to produce values ranging from –100 to 100. Topographic roughness was calculated using a 3-by-3 moving-window neighborhood calculation of the standard deviation of the elevation. We validated our habitat models with expert review and survey data. For cedar rim thistle (*Cirsium aridum*), we relied on statewide rare-plant predictive models developed by Fertig and Thurston (2003).

Offset goals for biological targets

Our intention with this analysis was not to reinvent the EIA process, as the literature on this subject is extensive (Sadar et al. 1995, Canter 1996); rather, we intended to provide an approach that could complement existing EIAs. Thus, for this assessment, we used a simple approach to quantify field-level impacts. Spatial data assembled for each of the biological targets were overlaid onto the field boundaries, and estimated acres of habitat within the bounds were included as impacts (table 1). Since it was obvious that impacts associated with development extend beyond areas of surface disturbance, we used the full-field, 24,407-ha boundary, even though the infill project was limited to a 12,343-ha area. These full-field impacts became the input goals for the Marxan algorithm, representing the minimum offset spatial goals.

Selecting potential offset sites with Marxan

When the decision to use offsets is made, there is often a desire to keep them as close as possible to the impact site so benefits accrue to the affected area. The choice of offset location that best balances proximity to the impact site with effectively achieving conservation benefits is often unclear. Here, we used the Marxan (version 1.8.2) site-selection algorithm developed by Ball and Possingham (2000) to illustrate how this tool can be used to determine an appropriate location and spatial extent for offset design. We developed criteria to ensure offsets would serve to mitigate on-site impacts (see below), then we ran analyses at progressively broader spatial extents, with the intention of selecting offsets at the smallest spatial extent at which goals could be met. We chose a nested set of areas in accordance with both biological and political constraints. The first area was limited to the Upper Green River Basin, focusing on the BLM's Pinedale Field Office boundary (figure 2). The second, expanded area included the Wyoming Landscape Conservation Initiative boundary (figure 2) component of the Healthy Lands Initiative of the Department of the Interior.

Marxan, a siting tool for landscape conservation analysis, explicitly incorporates spatial design criteria into the site-selection process. Marxan operates as a stand-alone program and uses an algorithm called "simulated annealing with iterative improvement" as a heuristic method for efficiently selecting regionally representative sets of areas for biodiversity conservation (Possingham et al. 2000). Marxan allows inputs of target occurrences represented as points or polygons in a GIS environment, and makes it possible to state conservation goals in a variety of ways, such as percentage area or numbers of point occurrences. The program also allows the integration of many available spatial data sets on land-use patterns and conservation status, and enables a rapid evaluation of alternative configurations. The ultimate objective is to minimize the cost of the reserve system (i.e., cost = landscape integrity, conservation cost in dollars, size of the reserve, etc.) while still meeting conservation objectives.

For both the fine-scale and broadscale analyses, the working group selected 500-ha hexagons (derived from a uniform grid) as the unit of analysis for running Marxan, because this spatial resolution was sufficient to represent biological targets and also large enough to permit efficient analyses across broad landscape scales. The effectiveness of a contiguous set of hexagonal units for defining natural variability, especially among spatially heterogeneous data sets, is well documented (White et al. 1992). Use of hexagons resulted in 12,159 analysis units (6,079,500 ha) for the larger study area and 1834

analysis units (917,000 ha) for the smaller area. Each hexagon was populated by summing the area of suitable habitat for the targeted community or species.

In addition to the biological information used to select potential offset sites, we incorporated a series of additional rules. First, we guided site selection to areas of high biological integrity (per Copeland et al. 2007). This is equivalent to the "cost" function used by Marxan (Ball and Possingham 2000). Given the difficulty of restoration in this dry sagebrush system (Monsen and Shaw 2000), the team felt it necessary to select areas with high integrity and allow mitigation funding to keep these systems from becoming degraded. Second, we blocked out areas (using status = 3 function; Ball and Possingham 2000) of high oil and gas development potential (based on USGS estimates of undiscovered technically recoverable resources, Energy Information Administration–proved reserve calculations, and a predictive model developed by one of the authors of this article [H. C.]). The team felt that this last rule was critical, given the commitment to maintaining the integrity of the offset for at least as long as impacts are incurred on-site. Because of the high degree of oil and gas activity in this area, we thought it would be prudent to forgo selection of areas with high future development potential for offsets, to prevent the possibility of establishing offset sites that may themselves need to be offset. Moreover, the high cost and regulatory uncertainty associated with working in areas with high resource potential constituted another reason to avoid selecting these areas.

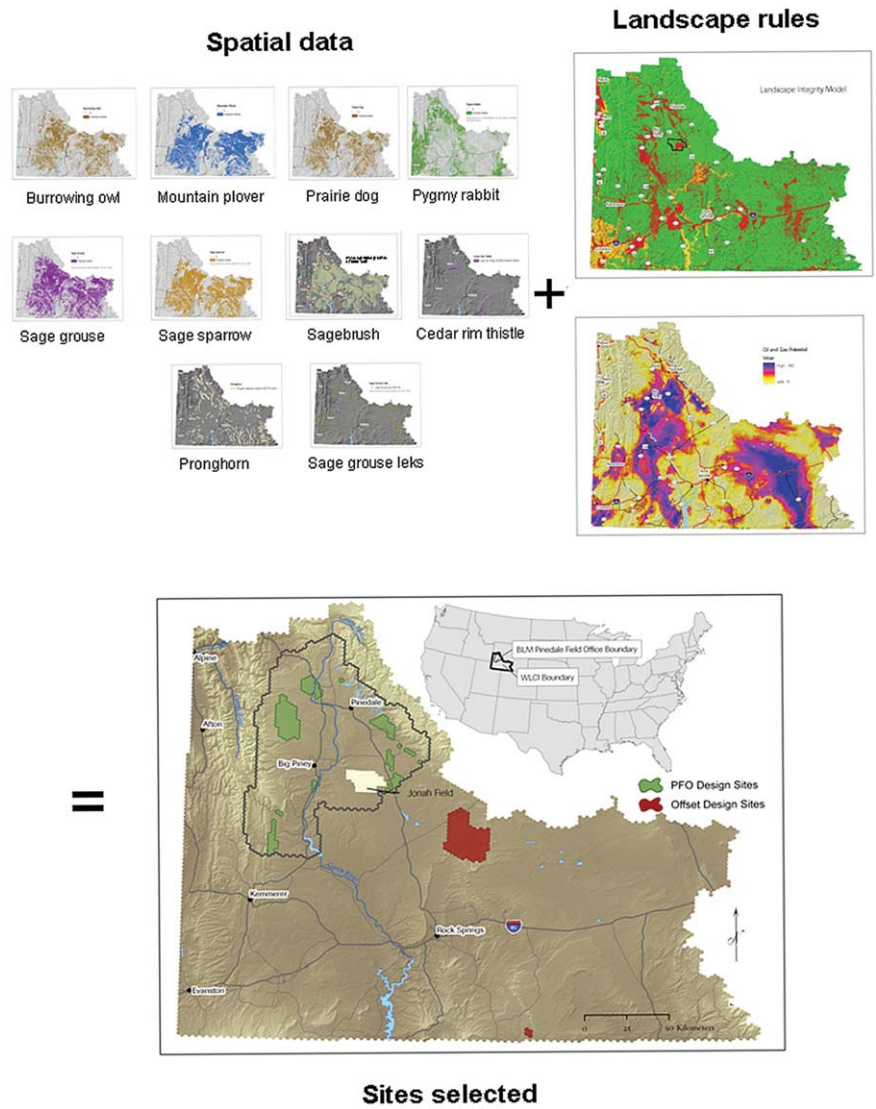

Figure 2. Use of the Marxan algorithm to select suitable offset sites as part of the Jonah natural gas field infill project. Spatial data layers were used both for assessing impacts resulting from development on the field and for selecting suitable offset sites. Landscape rules: "Intactness" (Copeland et al. 2007) and "Oil and Gas Potential" (based on US Geological Survey estimates of undiscovered technically recoverable resources, Energy Information Administration–proved reserve calculations, and a predictive model developed by H. C.) guided the selection of sites to areas of high habitat quality and low oil and gas development potential. Areas in green (smaller spatial extent) and red (larger spatial extent) represent the best fit of the Marxan algorithm based on these specific targets and specified rules. The inset map shows the location of Wyoming within the conterminous United States, as well as the location of the Wyoming Landscape Conservation Initiative and the Pinedale Bureau of Land Management Field Office Boundaries.

Goals achieved

At the smaller spatial extent, we selected 76,517 ha that were consistent with our offset goals. However, for several targets we were unable to meet even the minimum offset goals at the smaller extent (table 1). To achieve no net loss at this smaller spatial extent, given the constraints our team placed on selecting off-site sites (e.g., high intactness, low oil and gas potential), it would be necessary to reduce offset goals by mitigating impacts on-site using a step higher up the mitigation hierarchy. For example, on-site impacts and, in turn, the needs for offsets could be reduced by further avoiding or minimizing the footprint associated with development. Although the selected areas would not be sufficient to achieve no net loss because of the scope of on-site impacts, the selected areas could still be used as offsets when combined with areas

from the larger spatial extent. At the larger spatial extent, we selected 62,499 ha, and in contrast to the smaller spatial extent, we found ample opportunity to meet offset goals for all targets (table 1, figure 2). Both the small and larger spatial extents sites selected included a mix of public and private land, and a mix of potential restoration and protection offsets.

Discussion

Biodiversity offsets, the last step in the mitigation hierarchy (avoid, minimize, restore, offset), are conservation actions that seek to counterbalance residual impacts resulting from development with measurable conservation outcomes, with the aim of no net loss for biodiversity. Our study illustrates some general principles in offset design and site selection for mitigating impacts from development on the Jonah natural gas field in southwestern Wyoming. Offsets are intended to provide an additional tool to achieve the no-net-loss goal after efforts have been made to avoid and minimize impacts. To achieve no net loss, offsets—in addition to having a systematic selection process—must ensure that offset actions are genuinely new and additional contributions to conservation, and they will have to quantify ecological quality rather than simply use acreage units. The selection process we have outlined can incorporate these additional requirements.

To trade project impacts for offset benefits, we need to develop an appropriate currency (i.e., area, habitat quality) to ensure that offsets are sufficient. The framework we have developed starts this process by selecting a set of sites that have value for their ability to meet the biologically based offset goals within a landscape context, including consideration of landscape integrity and future potential impacts. As on-the-ground projects are considered, practitioners can establish a finer currency that incorporates the size of the impact and offset, as well as values associated with ecological functions, quality, and integrity. However, most offset programs methods for assessing currency are in their infancy. The exception is wetland offsets, for which methodological developments have been ongoing for more than two decades. Indeed, estimates of the number of available wetland assessment methods range upward of 100 individual tools (Bartoldus 1999). Despite the proliferation of assessment methods, all are subject to criticism, and few are actually used because of the high cost and complexity of application (Kusler 2003). In a study of more than 200 wetland mitigation banks throughout the United States, more than 60 percent of the banks defined credits simply by acreage (Environmental Law Institute 2002).

The framework we have developed will be integrated with the use of an assessment tool, although such a tool is not a key component of our current analysis. For the sagebrush ecosystem, several site assessment tools are available for use (i.e., USFWS 1980, habitat evaluation procedures; USNRCS 1997, ecological site descriptions; Parkes et al. 2003, habitat hectares approach). However, the lessons of wetland mitigation banking show that assessment tools will need to balance time and cost with scientific rigor. By incorporating a valuation process into a site selection framework, we streamline the assessment process. Moreover, if mitigation replacement ratios are adopted, as they are in wetland mitigation banking (see King and Price 2004), then our framework can easily incorporate this by adjusting the goals that are put into the Marxan algorithm.

The majority of offset policies (McKenney 2005) agree that compensatory actions must result in benefits that are additional to any existing values. For our offset design, we guided site selection toward areas with high-quality habitats. These areas may require minimal or no restoration, but they are at risk from future impacts (i.e., residential subdivision, invasive weeds). For example, since the 1970s, rural areas with desirable natural amenities and recreational opportunities throughout the United States have experienced a surge in rural development (Brown et al. 2005), with growth in the mountainous West during the 1990s occurring faster than in any other region of the country (Hansen et al. 2002). Home building in our project area reflected these national trends in the period between 1990 and 2001 (Gude et al. 2007).

We recommend the use of mitigation funds to maintain habitat quality by abating future impacts (i.e., residential development) as well as standard habitat improvements. Although this is different from the emphasis on habitat restoration or creation associated with wetland mitigation (Federal Interagency Mitigation Workgroup 2002), we feel that as long as mitigation action prevents the decline of habitat quality, the averted decline can be measured; and offset planning provides for adaptive management, should conditions or threats change, which can be a practical use of mitigation funds. Given the flexibility of our site-selection framework, offset projects conducted in different ecological or political settings can easily use it to adjust site selection toward areas with more potential for restoration, if that is desired.

Reaching no net loss will come from on-site actions that minimize impacts or restore habitat, combined with off-site actions that provide additional benefits. The appropriate temporal scale should be used when valuing the role of offsets in achieving no net loss. Offsets will need to persist for at least as long as impacts persist on-site, and their value will have to be assessed within a similar temporal framework. For our case study, we use a 30- to 50-year time frame to assess on-site impacts and value on-site restoration and offset value. We recognize, however, that without requiring offset benefits to precede impacts on-site, there may be a temporal lag in achieving no net loss. Offset projects associated with impacts on the Jonah Field will consist of both restoration and protection projects. Valuing restoration projects as a function of habitat improvement is a relatively straightforward process. Valuing protection projects intended to maintain existing quality will involve assessing the background rate of change that necessitates protection (e.g., residential subdivision) and asking what the quality of habitat would be during the time on-site impacts persist if the protection did not exist.

Moving forward, we hope that our study prompts offset practitioners to think strategically about site selection, and to

develop practical guidelines for when and how to guide this process. Site selection for offsets will obviously be an exercise in landscape analysis. Quantitative site selection tools (e.g., Arponen et al. 2007) such as Marxan provide a transparent, flexible, and rule-based approach to guide site selection. Where political pressures constrain practitioners to some extent, site-selection algorithms will allow them to determine whether it is possible to meet goals within those constraints. The framework we have developed can be applied if offsets have been selected as an appropriate tool; failure to systematically select suitable sites could reduce the potential benefits for conservation. Moreover, knowing when and how offsets can be applied—and knowing where they cannot—can be difficult to determine; offset use must be complemented by a rigorous process that ensures the mitigation hierarchy has been followed.

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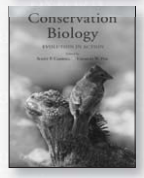

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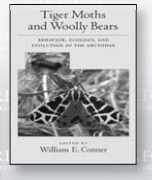

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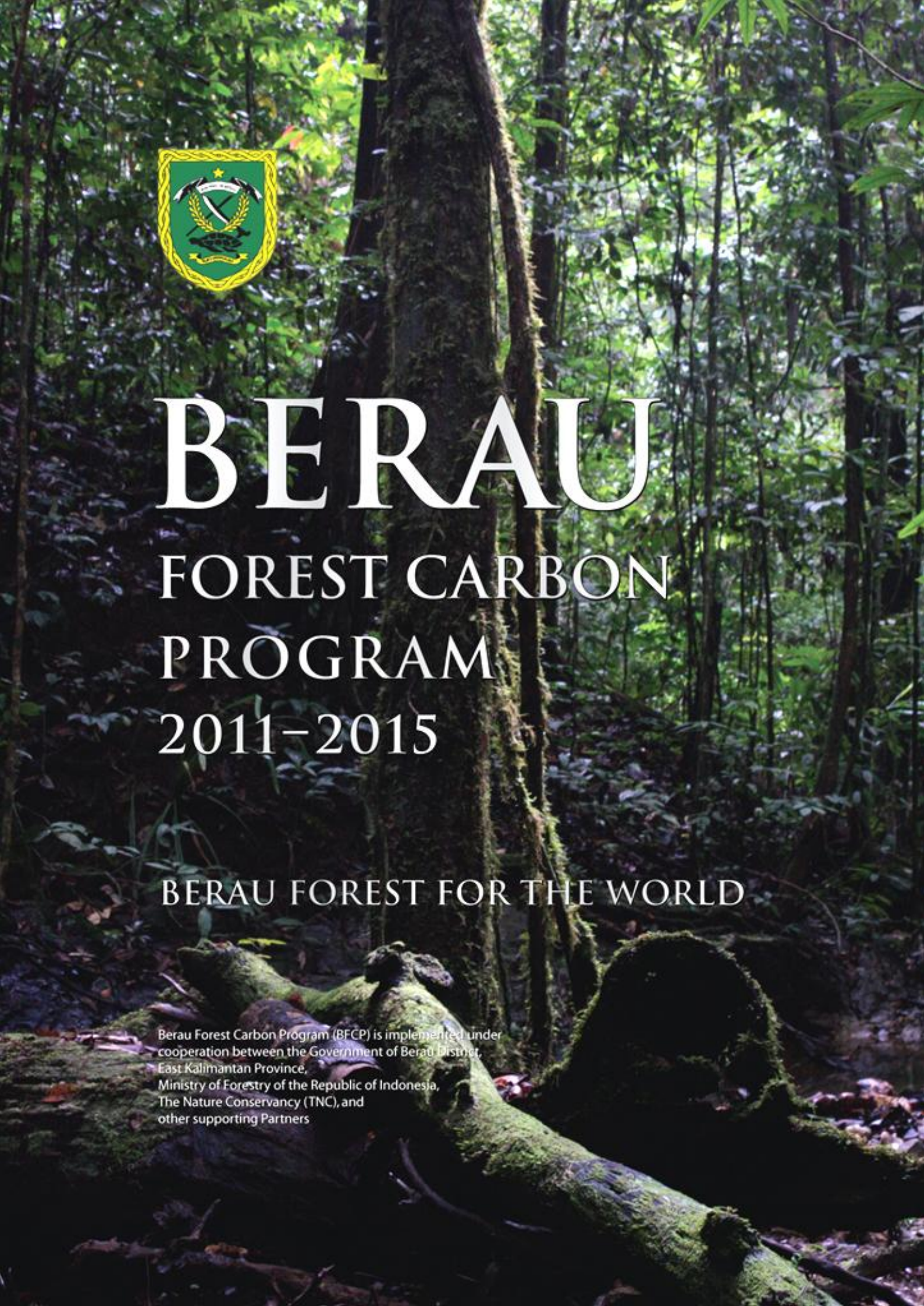

BERAU
FOREST CARBON PROGRAM 2011–2015

BERAU FOREST FOR THE WORLD

Berau Forest Carbon Program (BFCP) is implemented under cooperation between the Government of Berau District, East Kalimantan Province, Ministry of Forestry of the Republic of Indonesia, The Nature Conservancy (TNC), and other supporting Partners

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Preface

First of all, praise the Lord God Almighty for His grace and mercy that we have been given a region with extraordinary natural resources. The District of Berau, in accordance with the regional territorial mapping still owns ± 1.67 million hectares of Forest Estate Area, consisting of production forest and conservation forest with a relatively sound condition compared to other similar areas in East Kalimantan.

Furthermore, we have additional forests within the Non Forest Estate Area of ± 521 thousand hectares designated for various development activities in the Berau District, such as for timber plantation, agriculture, housing, mining and other non-forestry development.

Asides from the forestry sector, Berau District also has marine resource potential, such as marine coastal areas and small islands that serve as conservation zones, including Sangalaki Island and Semana Island which are the natural habitat of green turtles to lay and hatch their eggs.

Then, we also have one atoll, the Kakaban island, with a large lake in its inland filled by rare natural diversity, such as a variety of jellyfish; there are only two such islands in the world, one of them in the Berau District. In the coastal area we still have mangrove forest of ± 65.000 hectares.

Praise the Lord God Almighty for his Grace and Mercy that we have been able to complete this Document of the Berau Forest Carbon Program (BFCP) Strategic Plan.

We realize that the preparation of this document was done through a lengthy process with several changes in its concept to accommodate a participative process, combining research on policy, science, economy, ecology, as well socio-cultural in accordance to the local context in the District of Berau. This document harmonizes national, provincial and district strategic planning documents.

The background for the preparation of this Document of the Berau Forest Carbon Program Strategic Plan is the Government's commitment on greenhouse gas emission reduction of 26% by the year 2020 from its business as usual level. Most of these greenhouse gas emission reductions shall derive from the forestry, sector since it constitutes the largest source of emission in Indonesia.

In line with the commitment of the national government, in December 2009, the Governor of East Kalimantan declared his commitment to make East Kalimantan as a "Green Province" with the vision that East Kalimantan will serve as an example, not only for Indonesia but also the world, for reduced emissions combined with economic development. This concept covers a new sustainable and environmentally friendly economic development paradigm, based on the principle of "developing East Kalimantan for all".

To support the central government's commitment and that of the provincial government of East Kalimantan, we are proud that the District of Berau has been designated as one of the places to implement the *National Demonstration Activities for Reducing Emissions from Deforestation and Forest Degradation Plus* (DA-REDD+) in Indonesia, as launched by the Minister of Forestry on 6 January 2010.

Since 2008, the District Government of Berau has worked to study the possibility of implementing a REDD+ pilot program. At the first *Joint Working Group* forum in June 2009, the Berau Forest Carbon Program (BFCP) was declared as a district scale REDD+ pilot program.

BFCP is a partnership program between the District Government of Berau, East Kalimantan Province, The Nature Conservancy (TNC),other government institutions, NGOs, and other funding institutions to jointly develop a pilot program for the reducing carbon emissions from deforestation and degradation of forest and increasing carbon stocks through sustainable forest management, forest conservation and forest rehabilitation.

This program is developed as a proposal and as an important learning opportunity on how the concept of REDD+ could be implemented in a large and complex administrative territory and how it can be replicated in the future.

This program is designed to achieve sustainable forest and natural resource management in the District of Berau. With this program, it is expected that the District of Berau can achieve its development goals and manage its natural resources sustainably.

We believe that this program carries a positive message through our effort to jointly save the earth from further destruction, which impact is already starting to be felt by us.

The Berau Forest Carbon Program (BFCP) represents a concrete endeavor of the Berau District to support East Kalimantan's Green Program and the Indonesian Government's commitment in reducing green house gas emission reduction nationwide.

This is Berau's support to the world.

We would like to express our highest appreciation to all parties who have supported jointly with the Government of East Kalimantan, the Ministry of Forestry, Ministry for National Planning and Development Agency, Ministry of Environment, Ministry of State Affairs, The Nature Conservancy, Non-Governmental Organizations, and other funding organizations in making the Berau Forest Carbon Program possible. The members of the Berau REDD+ Working Group have greatly contributed in the preparation of this document

We hope this joint efforts may serve as a concrete contribution for the improvement in the quality of the environment and the sustainable development of the District of Berau.

Tanjung Redeb, March 2011

Head of Berau District

Drs. H. Makmur, HAPK, MM

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List of Terminology

REDD+ : The definition of REDD Plus (REDD+) according to the *Bali Action Plan* paragraph 1 b (iii), which is "policy and positive incentive approach on issues related to the reduction of emission caused by deforestation and forest degradation in developing countries, the role of conservation, sustainable forest management as well as increase in carbon stock in developing countries".

Forest : According to Law No 41 year 1999, forest is an integrated ecosystem comprised by land consisting of biological resources dominated by trees in their natural environment, inseparated from one to another.

Forest Area : Forest area is a certain territory designated or established by the government to be conserved as permanent forest (Laws No. 41 Year 1999 on Forestry).

Deforestation : Deforestation is the conversion of forest into a different land type, or the reduction of trees below the minimum of 10% forest cover (for long period of time) over an area at least 0.5 ha, where trees have a minimum height of 5 m (in situ)(FAO).

Degradation : Forest degradation is is a process of unsustainable or uncontrolled activities with a negative impact to the structure or function of forest land resulting in the decrease of its ability to provide forest services/products. In term of REDD+, forest degradation causes the reduction of carbon from the ecosystem. One way to measure degradation is by calculating the decrease of carbon stock per area unit (e.g. hectare).

LULUCF : Land Use, Land Use Change and Forestry; land use activities and forest conversion that cause green house gas emissions, and are a result of human activity.

IPCC : Intergovernmental Panel on Climate Change.

AFOLU : Agriculture, Forestry and Other Land Use; are sectors of Agriculture, Forestry, and other land use that play a role in greenhouse gas emissions. This terminology is used in the Good Practice Guidelines for Greenhouse Gas Inventory *(IPCC GPG 2006).*

REL/RL : According to the UN Doc FCCC/SBSTA/2008/6, the REL *(Reference Emission Level)* is the baseline to measure emissions from deforestation and forest degradation, based on historical data, and considering, *inter alia*, the trends, initial time and duration of the period for reference, and the national specific condition/special condition. As a result of the meeting of experts of REDD-UNFCCC in Bonn, March 23-24, 2009, the RL *(Reference Level)* is the total net/gross emission (including sources and sinks from conservation, sustainable forest management, and carbon stock piling).

MRV : Measurable, Reportable and Verifiable; is part of the monitoring system and mitigation action evaluation which will be registered by countries to the UNFCCC. In its implementation, MRV principles are established by the UNFCCC, IPCC and the Kyoto Protocol, particularly the principle of *common but differentiated*

responsibilities and respective capabilities as well as historical responsibilities for greenhouse gas emissions of each country.

Displacement of emission or ***leakage*** is the impact caused from the emission reduction mitigation activity outside the peripheral of the reforestation and rehabilitation activity and forest conservation. *Leakage* does not exist in activity of REDD+ national coverage.

CHAPTER 1

Berau's Contribution to The World

1. Indonesia is Facing Climate Change

Carbon dioxide and other greenhouse gases have increased rapidly in the atmosphere (under 300 ppm during the pre-industry period up to 433 ppm in the year 2005) due to human activities. This condition has caused a phenomenon known as *global warming*. As the average temperature of the earth's surface increases, climate change occurs, causing extensive drought, flood, storm and the increase of the sea level.

This phenomenon has compelled many countries to recognize climate change as the greatest threat to human kind in this century. *The Intergovernmental Panel on Climate Change (IPCC)*has predicted various future scenarios of greenhouse gas emissions and levels of climate change, ranging from significant to catastrophic impacts on human life, global economy, and communities.

Although there is global consensus that acknowledges the uncertainty around these scenarios, the risks faced at present are considered quite alarming. Global action is needed to coordinate climate change mitigation.

Several reports have indicated that deforestation and forest degradation contribute to 18% of global greenhouse gas emissions, of which 75% are from developing countries — including Indonesia (Stern Review 2006). These factors are a serious threat to the resources and livelihoods of local communities, watersheds, and the existence of biodiversity. Therefore, the reduction of carbon emissions from the forest sector becomes critical as it not only contributes to the global effort in mitigating climate change, but also contributes to other social and ecological benefits.

Indonesia, under the leadership of President Susilo Bambang Yudhoyono, is pioneering several important contributions related to climate change. First, Indonesia hosted the 13th *Conference of Parties*/COP-13 of the United Nations Framework Convention on Climate Change (UNFCCC) in Bali, 2007. Second, Indonesia organized and participated in a series of summits on reduction of greenhouse gas emissions from the land use, land use change and forestry sector (LULUCF), which is the major contribution of emissions in developing countries.

At the G-20 summit, September 2009 in Pittsburgh, United States, President Yudhoyono stated that Indonesia is committed to an emission reduction target of 26% by the year 2020, as laid out by the Bali Roadmap (Fig. 1). Further, President Yudhoyno stated an additional 15% emissions reduction would be reached if significant foreign assistance is made available.

These targets make Indonesia the first of larger, developing countries to promise such a commitment. Indonesia later reassured its commitment at the COP-15 meeting in Copenhagen, Denmark, December 2009.

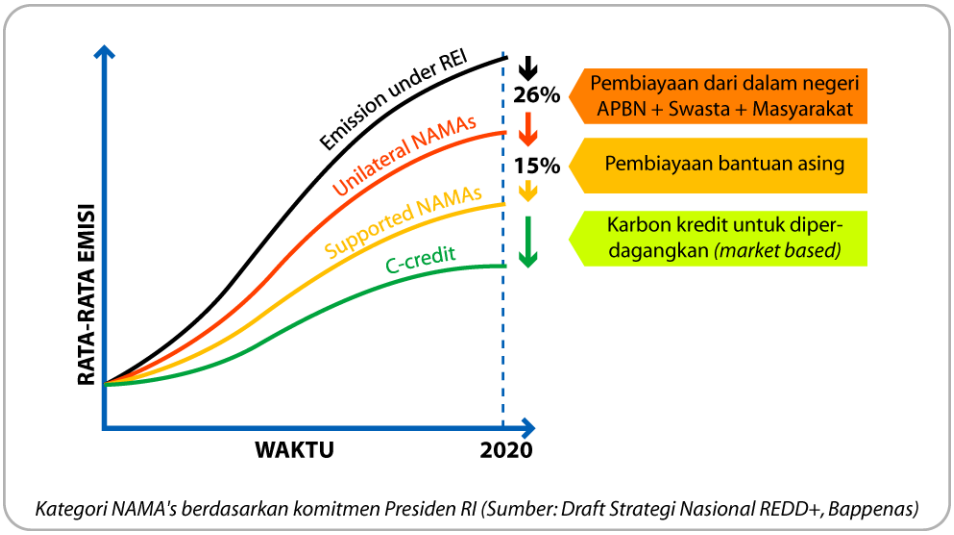


Figure 1. Indonesia's greenhouse gas emission reduction targets for the year 2020.

The draft of the National Strategy for Reducing Emissions from Deforestation and Forest Degradation (REDD+) was prepared by the Ministry of National Development Planning (Bappenas) in November 2010. The Presidential Working Unit for Monitoring and Control Development (UKP4) is finalizing the document. This document will serve as a guideline for REDD+ implementation with regard to the emission reduction commitments made by President Yudhoyono. As laid out in the draft REDD+ National Strategy, GHG emission reduction targets will be met through Nationally Appropriate Mitigation Actions (NAMA's). The 26% target will be met through *unilateral* NAMA's, 41% through *supported* NAMA's (with funding) and above 41% through *carbon credit trading* or market mechanisms. In the implementation of all these categories, human resource capacity building and technology transfer need to be implemented sustainably and supported by international grants.

Definition of REDD+

The basic concept of REDD+, or *Reduced Emissions from Deforestation and Forest Degradation* is simple: governments, corporations and forest owners in developing countries should be given credits or rewards (in the form of economic benefits) for the actions taken in verifiably reducing emissions that arise from deforestation and/or forest degradation.
The idea to offer incentives to forest managements that prevent deforestation and forest degradation was discussed during the Kyoto Protocol negotiations, but it was rejected. The REDD scheme was then developedfrom a proposal by The Coalition of Rainforest Nations in 2005.

Two years later, the proposal was presented at the UNFCCC 13th Conference of Parties in Bali, 2007.

The issue of deforestation was introduced under an agenda of Reducing Emissions from Deforestation in Developing Countries (RED) during the 11th COP in Montreal, 2005, which was positively received by many countries. In several UNFCCC forums such as the COP and Subsidiary Body (SB), many parties feel that REDD should be mandatory. Given the different national conditions of each country, proportional and just RED approaches must be considered in the context of the climate convention proceedings.

The term REDD Plus (REDD+) was introduced at the 13th COP 13 in 2007 in Bali. Despite inclusion in the *Bali Action Plan,* REDD+ was first used by the Ad Hoc Working Group on Long-Term Cooperative Action (AWG-LCA), under the Convention on the 6th session in Bonn on June 12, 2009. In this document, REDD+ was further defined to include actions on GHG emission reduction from deforestation and forest degradation in developing countries as well as forest conservation, sustainable forest management, and carbon sequestration. The concepts of REDD+ were also stated in the *Copenhagen Accord* as the result of COP- 15 in 2009.

The benefit of this mechanism is that it opens opportunities for parties with different national situations to participate in a future REDD+ global framework.
Indonesia is home to the third largest tropical forest area in the world, after Brazil and the Democratic Republic of Congo, and plays a crucial role for the success of REDD+. Indonesia's high rates of deforestation and forest degradation are therefore an opportunity to apply positive incentive mechanisms for the Indonesian people.

2. Implementation of REDD+ in Indonesia

Implementation Stage

As part for preparing negotiations for COP-13, Indonesia carried out rapid studies/analyses on the status of its readiness to implement REDD+, in terms of methodology and policy. To facilitate this process, the Indonesia Forest Climate Alliance (IFCA) was established in July 2007. IFCA is a forum for communication/coordination among stakeholders to discuss issues on REDD+, including the advancement and output of the studies and research which were being carried out at that time.

The Government of Indonesia decided to make REDD+ a national program with its implementation is being carried out in stages from the sub-national level (Province, District, Management Unit), with integration at the national level (*national accounting with sub-national implementation*).

Based on the Indonesia – REDD+ Strategy, the REDD+ process is divided into three stages as follows (Fig. 2):

1. Phase 1, Preparatory Phase: Identification of the science and technology status and related policies (2007–2008)
2. Phase 2, *Readiness Phase*: Phase to prepare the methodology and policy (2009–2012)
3. Phase 3, *Full Implementation*: this is the full implementation in accordance with the COP rules when REDD+ becomes part of a UNFCCC program, post-2012.

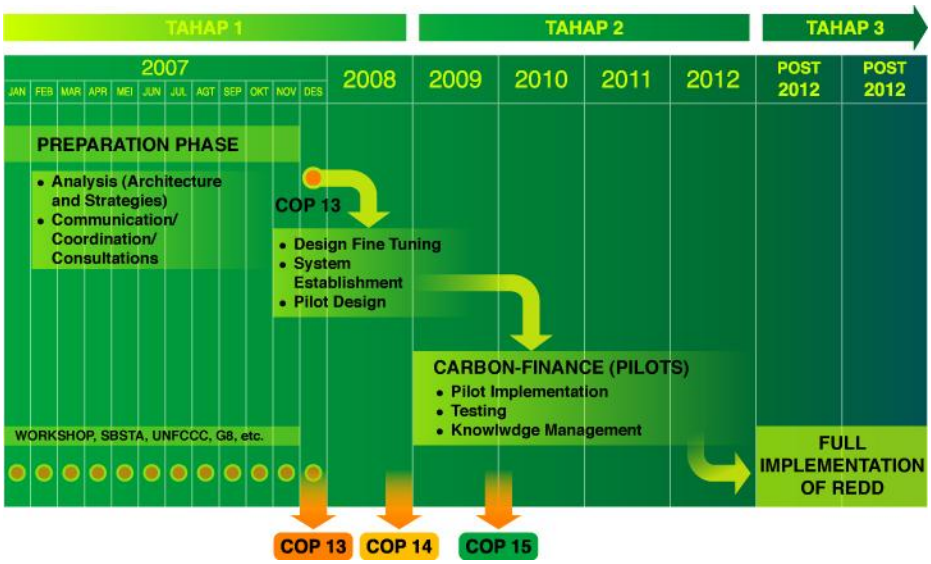


Figure 2. The concept of REDD+ implementation in Indonesia (BAPPENAS 2010)

For the *Readiness Phase*, Indonesia needs to prepare the instruments required for the implementation of REDD+ post-2012. These instruments need to address the basic causes of deforestation, institutionalizing funding and mechanisms for the distribution of incentives, as well as the participation of parties that include communities within and surrounding forests.

Observing the progress of negotiations among countries at the global level compared with Indonesia's current preparation status, it seems that the national REDD+ readiness plan will not be achieved within the initial timeframe.

Activities and Demonstration Area

On January 6, 2010, the Indonesian Forestry Minister, Zulkifli Hasan, signed the launching of the first *Demonstration Activities-Reducing Emission from Deforestation and forest Degradation* or DA REDD+ in Indonesia. These constitute REDD+ pilot activities for developing methodologies and policies, and are part of the *Readiness Phase* leading up to post-2012.

Four DA REDD+ activities which were launched by the Ministry of Forestry in cooperation with the Australian Government, the German Government, the International Timber Trade Organization (ITTO), and The Nature Conservancy (TNC). The latter began as a cooperation between the Government of Berau District (East Kalimantan Province) with The Nature Conservancy - Indonesia Forest Program (TNC IFP). This cooperation is designed to support the implementation of a pilot program specially designed for sub-national implementation at the district level.

The development of DA REDD+ arose from the decisions of the COP-13 in Bali.Developing countries and developed countries are encouraged to cooperate in efforts to reduce deforestation and forest degradation in developing countries, including financial support, capacity building, and transfer of technology. DA REDD+ represents the most important component of the Indonesian REDD+ Readiness Strategy and is expected to be able to serve as a means for learning and communications in building commitments and synergy between parties.

Currently there are more than 40 REDD+ pilot projects in Indonesia, some of which include Jambi Province is a follow-up program of the Indonesia-Australia Forest Carbon Partnership, in Lombok as a collaboration with the Korean Government.

On December 30, 2010, the Province of Central Kalimantan was designated as a provincial scale DA REDD+. This pilot effort was established through a partnership between Indonesia and Norway. Central Kalimantan has some of the largest peatland areas in Indonesia, and peatland are a significant source of GHG emissions.

3. Berau's Position and Strategic Role

Green East Kalimantan Program (Kaltim Green)

The provincial government of East Kalimantan created a REDD+ Working Group in 2008 and since this time has been actively involved in the development of REDD+ strategies. The Governor of East Kalimantan declared his commitment to make East Kalimantan "The Green Province" in Balikpapan, December 2009. This declaration was followed by formation of a team comprised of senior officials to develop and implement the the KalTim Green Action Plan.

The vision of KalTim Green is to is to develop the province as a global example for how to combine GHG emission reduction goals with economic development, while ensuring development is sustainable and environmentally friendly. The overarching principle is"Developing East Kalimantan for all".

Kaltim Green has four goals:

1. To improve the quality of life of the people in East Kalimantan as a whole, achieving balance between economic, social, cultural, and environmental aspects.
2. To reduce threats associated with climate change, such as flooding, landslides, drought, and forest fire.
3. To reduce pollution and damage to land, water and air ecosystems.
4. To promote knowledge and awareness within the institutions and people of East Kalimantan on the importance of natural resources conservation by using those resources wisely.

The declaration of Kaltim Green which has been agreed upon by the Government of East Kalimantan Province and all the districts within East Kalimantan recognize the importance of reducing greenhouse gas emissions through five commitments:

1. To implement low carbon emission development strategies;
2. To integrate the development goals of the province;
3. To analyze and reform appropriate current development policies;
4. To promote research needed within the province and the nation to overcome the issue of climate change through networking with universities and colleges (especially in the forestry sector); and
5. To support climate change mitigation through cooperation with international institutions.

Berau's Condition and Profile

Berau is the third largest district in East Kalimantan with an area of 34,127 km^2 (13,176 mi^2) (Fig. 3). Approximately 2.2 million hectares are land and more than 75% of the land base is still covered by forest. Population is spread among 13 sub-districts with 107 villages for a total population of 164,501 and a population density of only 5 people per square kilometer. The district capital is the city of Tanjung Redeb. The district shares its borderswith the districts of Bulungan to the north, East Kutai to the south, Malinau to the west; to the east is the Sulawesi Sea.

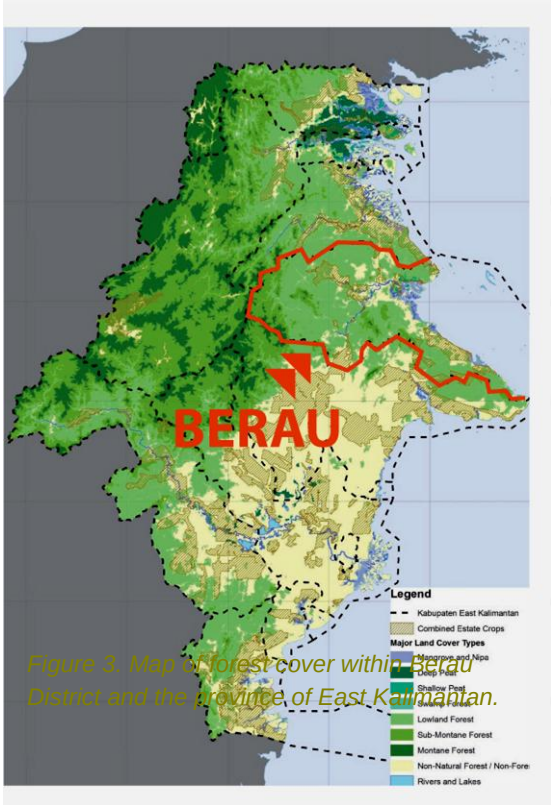
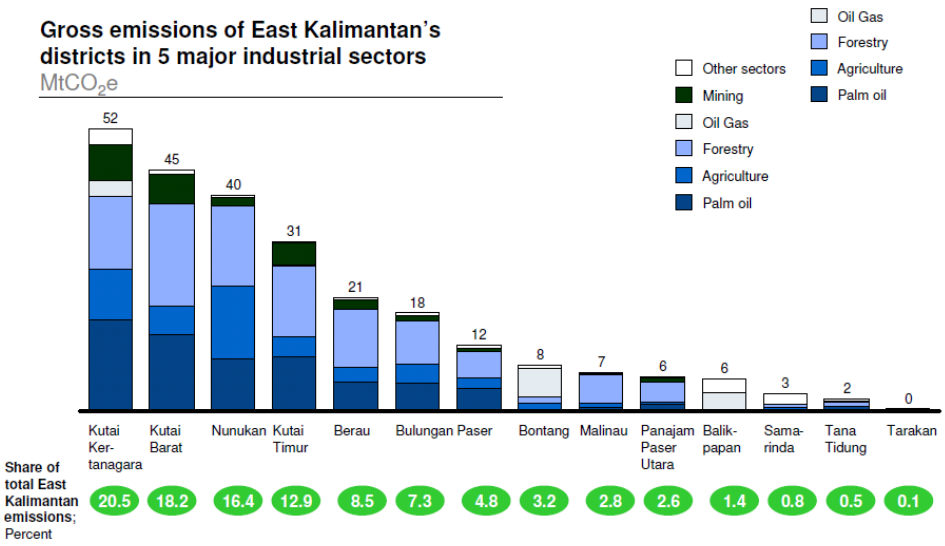


Figure 3. Map of forest cover within Berau District and the province of East Kalimantan.

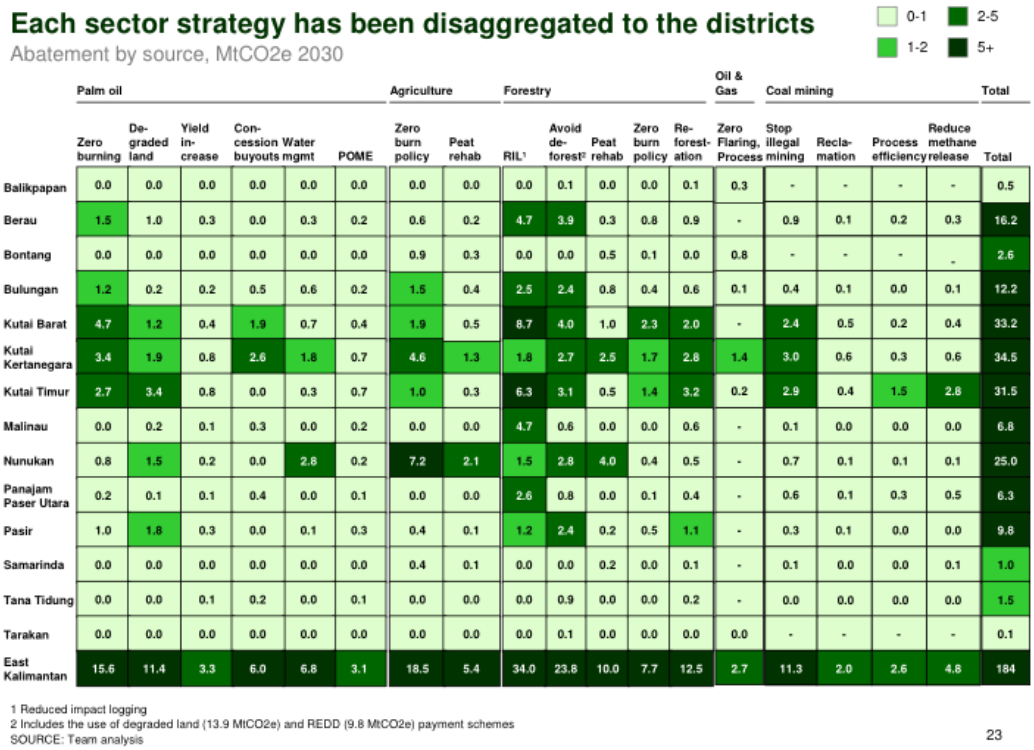
Mining (40% of GDP) and forestry (30% of GDP) dominate the economy of Berau District. Fourteen companies hold more than 880,000 ha of natural forest timber production concessions and three companies hold 60,000 ha of timber plantation forest. When combined, this comprises 40% of the total land base in Berau.

Berau is one of the districts with the largest area of remaining low land rain forest in the country. However, Berau faces many challenges from illegal logging, and for unsustainable forest clearing for development of oil palm plantations, forest timber plantations and coal mining. With such a large area of forest and high degree of threats, Berau represents a truly strategic place for the development of a REDD+ pilot in Indonesia.

Berau is estimated to produce more than 21 MtCO2e of emission per year, 8.5% of the total emission of East Kalimantan (Fig. 4). Berau is losing more than 24.000 ha of forest per year. The forestry sector is responsible formore than 10 MtCO2e per year, particularly from unsustainable logging practices within the natural forest timber production concessions (HPH). Moreover, there are permit allocations to open 100.000 Ha of palm oil plantations, which will contribute further pressure to the forests of Berau. The emissions produced by district, particularly from land use changes, is equivalent to 4.5 million cars.



Under a business as usual scenario GHG emissions from the land use, land use change and forestry sector are expected to continue increasing. However, estimates from the McKinsey group (Fig. 5) show that Berau could reduce GHG emissions in the LULUCF sector by more than 16 MtCO2e per year by 2030.



Each sector strategy has been disaggregated to the districts

Abatement by source, MtCO2e 2030

0-1 | 2-5 | 1-2 | 5+

	Palm oil						Agriculture		Forestry					Oil & Gas	Coal mining				Total
	Zero burning	De-graded land	Yield in-crease	Con-cession buyouts	Water mgmt	POME	Zero burn policy	Peat rehab	RIL[1]	Avoid de-forest[2]	Peat rehab	Zero burn policy	Re-forest-ation	Zero Flaring, Process	Stop illegal mining	Recla-mation	Process efficiency	Reduce methane release	Total
Balikpapan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.3	-	-	-	-	0.5
Berau	1.5	1.0	0.3	0.0	0.3	0.2	0.6	0.2	4.7	3.9	0.3	0.8	0.9	-	0.9	0.1	0.2	0.3	16.2
Bontang	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.3	0.0	0.0	0.5	0.1	0.0	0.8	-	-	-	-	2.6
Bulungan	1.2	0.2	0.2	0.5	0.6	0.2	1.5	0.4	2.5	2.4	0.8	0.4	0.6	0.1	0.4	0.1	0.0	0.1	12.2
Kutai Barat	4.7	1.2	0.4	1.9	0.7	0.4	1.9	0.5	8.7	4.0	1.0	2.3	2.0	-	2.4	0.5	0.2	0.4	33.2
Kutai Kertanegara	3.4	1.9	0.8	2.6	1.8	0.7	4.6	1.3	1.8	2.7	2.5	1.7	2.8	1.4	3.0	0.6	0.3	0.6	34.5
Kutai Timur	2.7	3.4	0.8	0.0	0.3	0.7	1.0	0.3	6.3	3.1	0.5	1.4	3.2	0.2	2.9	0.4	1.5	2.8	31.5
Malinau	0.0	0.2	0.1	0.3	0.0	0.2	0.0	0.0	4.7	0.6	0.0	0.0	0.6	-	0.1	0.0	0.0	0.0	6.8
Nunukan	0.8	1.5	0.2	0.0	2.8	0.2	7.2	2.1	1.5	2.8	4.0	0.4	0.5	-	0.7	0.1	0.1	0.1	25.0
Panajam Paser Utara	0.2	0.1	0.1	0.4	0.0	0.1	0.0	0.0	2.6	0.8	0.0	0.1	0.4	-	0.6	0.1	0.3	0.5	6.3
Pasir	1.0	1.8	0.3	0.0	0.1	0.3	0.4	0.1	1.2	2.4	0.2	0.5	1.1	-	0.3	0.1	0.0	0.0	9.8
Samarinda	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.2	0.0	0.1	-	0.1	0.0	0.0	0.1	1.0
Tana Tidung	0.0	0.0	0.1	0.2	0.0	0.1	0.0	0.0	0.0	0.9	0.0	0.0	0.2	-	0.0	0.0	0.0	0.0	1.5
Tarakan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	-	-	-	-	0.1
East Kalimantan	15.6	11.4	3.3	6.0	6.8	3.1	18.5	5.4	34.0	23.8	10.0	7.7	12.5	2.7	11.3	2.0	2.6	4.8	184

1 Reduced impact logging
2 Includes the use of degraded land (13.9 MtCO2e) and REDD (9.8 MtCO2e) payment schemes
SOURCE: Team analysis

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Figure 5. Potential CO2e reduction in the LULUCF sector for each district in East Kalimantan Province (McKinsey).

As in other regions in Indonesia, the trigger for the loss of forest in Berau is also strong, being based on economic activity. Deforestation in Berau is directly affected

by the extraction of natural resources such as timber and mineral, and the production of agricultural commodities, particularly palm oil and pulp. The economic value of the current forest estate cannot make conservation or sustainable forest management a viable option compared with development of extractive and production industries.

The rate of deforestation is also caused by weak governance of natural resources, which was not designed or managed for strategic, sustainable development. The establishment of poorly managed forest plantations and natural forest timber concessions contributes to illegal forest intrusion, degradation and deforestation.

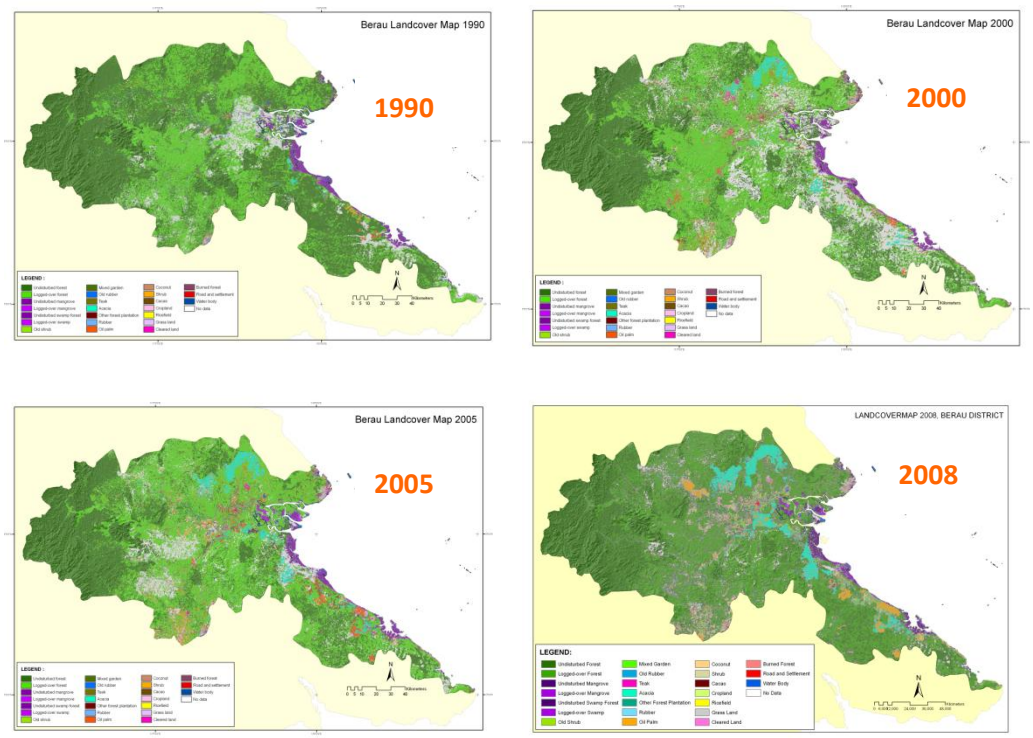


Figure 6. Patterns of deforestation in Berau District between 1990 and 2008.

Within the last two decades, forest fire is one of the main causes of deforestation and degradation. The building of road infrastructure into the most remote area stimulates further the process of forest encroachment and conversions. The increasing of human population within the forest, the migration of people into the forest seeking for land, the communities live in the forest who generally involved in shifting cultivation also contribute to forest degradation.

Drivers of Deforestation and Forest Degradation in Berau

Legal Logging. Approximately 40% of Berau's land base is dedicated to natural forest timber production concessions. To achieve sustainable forest management, Reduced Impact Logging should be implemented. Poor forest management, evidenced

through lack of planning, little oversight on harvesting, and weak monitoring by government officials, will encourage deforestation and forest degradation which eventually contribute to excessive emissions.

Illegal Logging. Poor forest governance contributes to illegal logging in all forest zones, including in protection forest. The rate of forest lost increased which indicated from a total emission of 4% to 9% between 2000 to 2008.

Conversion of Natural Forest into Plantation Forest. On average, plantation forests store less carbon than natural forests. The development of three plantation forest concessions in Berau contributes significantly to the district emissions profile. A total of 74,000 hectares of primary and secondary forest currently carrying plantation forest permits may contribute to future emissions. As a whole, Berau has not been affected by plantation forest trends as in other parts of Indonesia. However, this may change. Since 2000, there has been an annual 30% increase in the development of acacia timber plantation area.

Shifting Cultivation. Most of the rural population in Berau is involved in shifting cultivation, or temporary planting in one area for several years, then shifting to another area while leaving the first area fallow, then returning again after sometime. The total area of such activity may reach 50,000 hectares per year. The emission resulted depend on the type of forest clearing. Increasing area in oil palm plantations causes a higher degree of farming in the forest.

Natural Forest Conversion into Oil Palm Plantation. The oil palm plantation sector in Berau, as many others in Kalimantan, has increased in the last 5 years. Permits and licenses for this activity have reached almost 200,000 hectares This includes forested areas and areas ready for planting. The total emission related to oil palm plantation development, as well as development from other land use change, could reach 100 million tons CO2e.

Mining. A total of 27 mining concessions hold a total of 185,000 ha in Berau. Until today, the actual emissions and carbon footprint are still relatively low However, considering the large potential of coal and limited gold deposits, these sectors are predicted to contribute excessive emissions in the future.

Mangrove Conversion for Shrimp Farming. Berau has one of the largest and most natural mangrove ecosystems in Borneo. Historically, there have been no major or moderate deforestation for establishment of shrimp farms.However, migration towards the coastal areas might be a threat.

Berau's Contribution to the World

Considering the above factors, it is clear that the District of Berau holds a very strategic position and role in supporting the commitment of the central and provincial government to address the challenges of global climate change.

The District Government of Berau is committed to implement the first REDD+ pilot program in Indonesia, even in the world, through establishing a model of low emissions development that is based on sustainable governance of natural resources.

The District Government of Berau is determined to change the course of its development through transformation in the governance of its natural resources, strengthening institutions, and capacity building of human resources.

This is Berau's support (present) for the World (future).

Assistance and cooperation from the central and provincial government, as well as from other related partners are greatly needed by the District Government of Berau in building the appropriate focus of Forest Carbon program to jointly resolve the challenges and develop innovative measures.

CHAPTER 2

Strategic Plan 2011 – 2015

1. Berau's REDD+ Pilot Program

Program Development

After considering the explanation in the previous chapter and understanding Berau's strategic position and role in supporting the central and provincial government's commitment in facing the challenges of climate change, it is clear that Berau carries a great opportunity to implement a REDD+ pilot program at a district scale through the development of a model of development based on low emissions and sustainable natural resource management.

The Indonesia Forest and Climate Alliance (IFCA) Consolidation Report of 2007 strongly recommended the development of an integrated pilot program development at a district level to test the strategy to reduce forest carbon emissions.

A district scale carbon emission reduction pilot program as recommended will focus on the management of conservation forest, production forest and areas outside the government forest estate.

The integration of strategies of several different regions will serve as a useful learning process for districts, provinces and the national government to create a development planning system which is environmental friendly and low emission.

Another advantage of the district scale approach includes the opportunity to focus on the integration between development strategies and to reduce the impact of climate change. This initiative is expected to be able to monitor the trend of emissions at a district level, not only at a site level; therefore, this approach is able to avoid leakage at the district level. This approach offers greater benefits compared with single purpose forest management. The district approach depends on strong holistic management, involving many stakeholders in an integrated manner, including government, communities, Non-Governmental Organizations and the private sector.

For this district scale program, the collaborative work between the government, private sector and civil society remain the key factors for success.

The government is the main actor through their role in developing strategic planning, spatial planning and management actions, creating enabling conditions for policy and directing government resources to endorse low carbon development. Most of the land area in Berau is managed by the private sector therefore they are responsible in implementing the government's strategy of low carbon development.

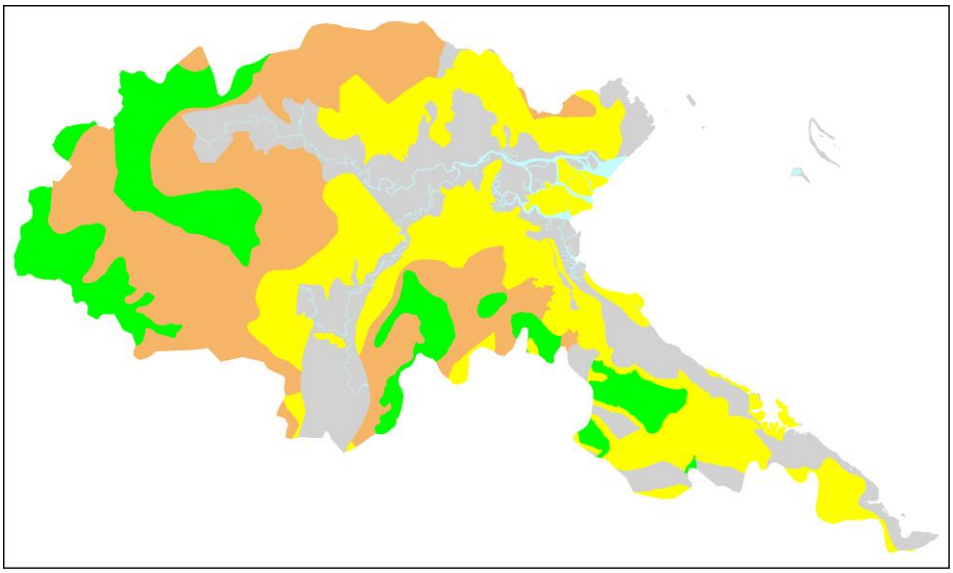
The people are the main stakeholders in all aspects of forest planning and management.

The role of the district government is critical to the success of the implementation of REDD+ through the process of decision making, supervision of protection forest, production forest and forest outside the government forest estate. On the other hand, the governments at the provincial and national level also play an important role.

The decision to issue permits and licenses by the Ministry of Forestry, The Ministry of Agriculture and The Ministry of Energy and Mineral Resources will have a substantial impact on the success of REDD+ at the district level. The decisions issued by those ministries, jointly with other ministries and agencies such as the Finance Ministry, the National Planning Agency and others will have an impact on the achievement of the goals on a district scale.

Berau Forest Carbon Program (BFCP)

The District of Berau, with a forest area of 2.2 million hectares according to the Forestry Ministerial Decree No 79/Kpts – II/2001 on the appointment of Forest and Water Area in the region of East Kalimantan Province (Fig. 7), represents a microcosm of Indonesia, with its diverse economic activities, types of forest and threats.



Lampiran :
SK MENHUT 79 tahun 2001

Legenda :
- **APL**
- **HL**
- **HP**
- **HPT**
- **Tubuh Air**

APL	= 527870.77 ha
HL	= 360356.792 ha
HP	= 626875.222 ha
HPT	= 676188.254 ha
Tubuh Air	= 28685.667 ha
Grand Total	= 2219976.705 ha

APL: Area for other uses, outside the forest estate
HL: conservation forest, in the forest estate
HP: production forest, in the forest estate
HPT: limited production forest, in the forest estate
Tubuh air: Water body

Figure 7. Type of Land Uses in Berau Forest (The Indonesian Ministry of Forestry, 2001)

Since 2008, the District Government of Berau and The Nature Conservancy Indonesia Forest Program (TNC-IFP) began to explore the potential of implementing the REDD+ pilot program on a district scale by utilizing the foundation of existing programs in the District of Berau. On April 2008, the REDD+ Berau Working Group, whose members comprise representatives from government institutions, private sectors and civil society was established as an initiation of the REDD+ Berau pilot program.

REDD+ Berau Working Group then initiated the establishment of a Joint Working Group which is a forum of key parties, either at district, provincial or national level, in the development of the REDD+ pilot program at the district scale in Berau.

At the first Joint Working Group in June 2009, the Berau Forest Carbon Program or BFCP as a REDD+ pilot program at the district scale of Berau was declared. The Berau Forest Carbon Program later was stated as one of the Demonstration Activities REDD+ (DA – REDD+) in Indonesia by the Ministry of Forestry on January 6, 2010.

BFCP is developed as an important learning platform, providing opportunity to actualize the concept of REDD+ which can be implemented in a large and complex administrative region. Furthermore, BFCP also offers opportunities to improve capacities for developing and managing a REDD+ program so that it can be replicated elsewhere.

2. Basic Policy

Vision, Objective and Goals

The Berau Forest Carbon Program is a partnership program between the District Government of Berau, East Kalimantan Province, The Ministry of Forestry, other government institutions, Non Government Organizations (NGOs) and funding institutions to jointly develop a forest carbon pilot program to reduce emissions from deforestation and forest degradation and enhance sequestration through sustainable forest management, forest conservation, ecosystem restoration and forest rehabilitation.

Vision of the Berau Forest Carbon Program 2011– 2015 is:

Berau District becomes a model of low-carbon growth development and sustainable natural resources management.

The strategic goals and program objectives of this first five year phase of the REDD+ pilot in the District of Berau are to strive for a single integrated program covering the following:

1. Planning improvement and refinement, particularly in relation to spatial planning, land use planning and spatial permitting processes at the district level.
2. Forest carbon emissions reduction and sequestration to equal a net reduction around 10 million tons CO2e during the first five years or a reduction of at least 10% from Business as Usual (BAU), especially in the forestry and land use change.
3. The improvement of public welfare for 5,000 people living within or around the forest estate.
4. Protection of valuable ecosystems, biodiversity and watershed function of approximately 400,000 hectares in the watershed area of Kelay and Segah, including orangutan habitat.
5. Capacity building within public institutions and for stakeholders, particularly human resources and funding sustainability.
6. Learning and replication on the implementation of the pilot phase of REDD+ at the district scale, up to national and international levels.

Implementation Stage

Overall, the Berau Forest Carbon Program will be implemented in four phases, which are: scoping phase, development phase, pilot phase and full implementation phase. The Berau Forest Carbon Program will gradually build several factors. Given that the program is a pilot program, it will address issues of limited institutional management capacity, fulfillment of the prerequisites and conditions for the implementation of REDD+ at national level, and current absence of a long term financial incentive scheme.

These gaps also stem from international agreements and policies which are still in a deliberation stages.

The scoping and the program development phases have been carried out since 2008. Below is a brief explanation on the process and achievement of each phase as follows:

Scoping Stage (April–December 2008)

The District Government of Berau, supported by TNC IFP, tried to obtain and secure political and policy endorsement, from the government, at the district, provincial, central levels, particularly from the Ministry of Forestry, for the initiation of a REDD+ pilot program on the district scale.

In April 2008, the Head of Berau District through Decree No. 313 (which was later on modified with Decree 716 year 2009 on 21 of December 2009), established the Berau REDD+ Working Group, whose members were to be comprised of representatives from government, the private sector and private citizens.

The Berau REDD+ Working Group became actively involved to find and study the possibility for the development of a REDD+ pilot program in Berau. Some key findings that were obtained during this scoping phase are: Berau forest cover is still high, but there is a high threat of deforestation and forest degradation; the availability of relevant data and information is not sufficient for taking strategic decisions; and there is still no certainty on the policy of forest carbon at the national and international level.

On the other hand, parties who were involved in the Berau REDD+ Working Group strongly believed that a pilot project at the district level needed to be developed right away.

Development Stage (January 2009–December 2010)

Starting from those findings stated above, the REDD+ Working Group, supported especially by TNC IFP, carried out an in-depth analysis on the conditions and problems, particularly regarding the forestry sector and land use change dynamics in Berau.

These analyses cover studies on the profile of estimated emissions from Berau's forestry and land use change sector, the rate of Berau's deforestation and forest degradation, the drivers of land use change in Berau, as well as the latest condition on the readiness to implement the pilot phase of REDD+ at the district scale in Berau.

To ensure coordination of the development phase at the district, provincial and national levels, and to ensure that the participation and collaboration of all stakeholders goes well, the REDD+ Working Group, which is the forum of key parties -at district, provincial, and national level- pushed the establishment of a Joint Working Group. This Joint Working Group is a forum of all the key parties at the

district, provincial, and national level, to develop a pilot REDD+ program at a district scale in Berau. This forum serves as a place where all the parties can share their ideas. At the same time it offers a space for the central government to present its guidelines in the process of preparing national REDD+ strategies and policies. During the development of this phase, the Joint Working Group forum met three times, in June and October 2009 and lastly in February 2010.

The Berau REDD+ Working Group also improved the program plan and institutional framework of the program. The Strategic Plan Document BFCP 2011–2015 is the result of the process of planning, going through several stages of deliberations and multiparty discussions. The Strategic Plan of BFCP 2011–2015 was set in accordance to the process and results of the REDD+ National Strategic Planning by the National Development Agency.

The three milestones achieved by the development phase are:

1. The Minister of Forestry declared the District of Berau as for a National REDD+ Demonstration Activity (DA-REDD+) in Indonesia with TNC IFP as its main partner. The launching of Berau District as one of the first four DAs in Indonesia on January 6, 2010 represents an important political endorsement for the initiation of the Berau Forest Carbon Program.

2. On the same occasion, the Indonesian Minister of Forestry launched the bilateral cooperation between the Indonesian Government and German Government under the Forest and Climate Program (FORCLIME). This cooperation is also implemented at sub – national level (district), with two districts designated as pilot areas, which are the District of Kapuas Hulu (West Kalimantan) and the District of Malinau (East Kalimantan).

   After undergoing a process of feasibility study in February – March 2010, the District of Berau was designated as the third district in the FORCLIME program. The integration of FORCLIME into the Berau Forest Carbon Program represents concrete support in terms of financing and management for the program.

3. Through the Forestry Ministerial Decree Number: SK.649/Menhut-II/2010, on 22 of November 2010, a Natural Production Forest Management Unit (KPHP) was established, as the West Berau FMU, in Berau District, East Kalimantan Province, with an area of 775,539 ha. The establishment and development of the West Berau FMU represents very strategic support, forming an institutional aspect for the Berau Forest Carbon Program.

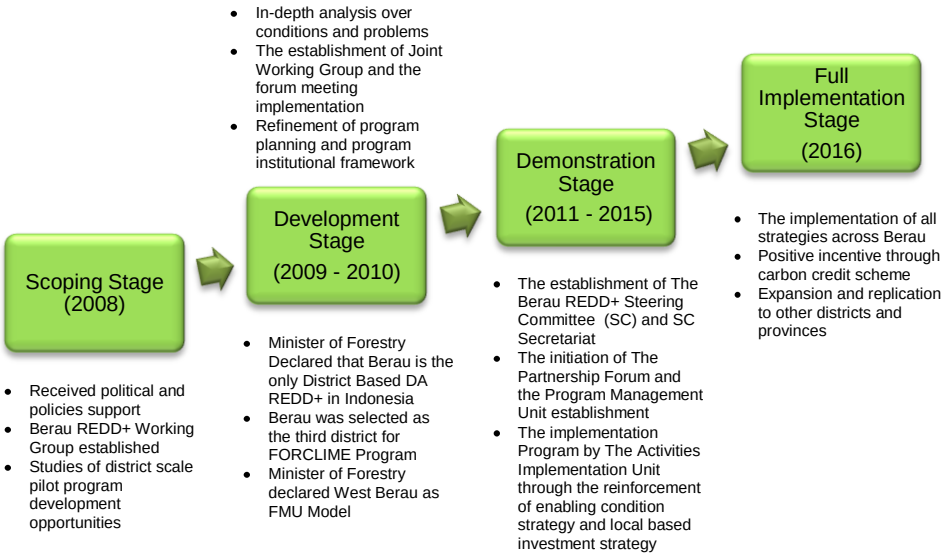


Figure 8. Berau Forest Carbon Program Demonstration Phases

Demonstration Stage (2011-2015)

The following BFCP demonstration phase will be implemented in 2011–2015 as part of the national effort for REDD+ readiness in Indonesia.Full implementation phase where carbon emission reductions occur in accordance to the requirement of UNFCCC-COP will be initiated by 2016.

In the Demonstration phase, the program will invest resources on efforts to reduce emissions on selected sites, promote the development of MRV systems (*Measurable, Reportable and Verifiable)*, and at the same time identify and develop appropriate decision making tools for optimizing planning and land use . These tools will consider the development of policies and approaches, and positive incentives at the global level.

Considering these factors and possibilities, the program will be implemented adaptively with the ability to respond to development that will occur. At the end of each phase, it is expected there will be a consensus on the policy approach, positive incentives will already be in place, and the scheme will be able to serve as the foundation for the final phase of the program, which is full implementation of REDD+.

3. Basic Strategy

Considering the complexity of the problems that need to be dealt with and should be addressed by a district scale REDD+ pilot program, the reduction of emissions should target the implementation of an integrated and comprehensive low carbon development strategy from upstream to downstream that is multi-sectoral, multi-aspect. Such approaches shall consider the principles of reducing emission *sources* and at the same time increase carbon stock through sequestration (*sinks*).

The main BFCP interventions shall be done through two program components which will be carried out simultaneously and in an integrated manner, which are: **Enabling Condition Reinforcement Strategy** and **Site Based Investment Strategy.**

The Enabling Condition Reinforcement Strategy shall be implemented in a cross-sector manner, while the Site Based Investment Strategy shall be implemented at the land management unit level (Fig 9).

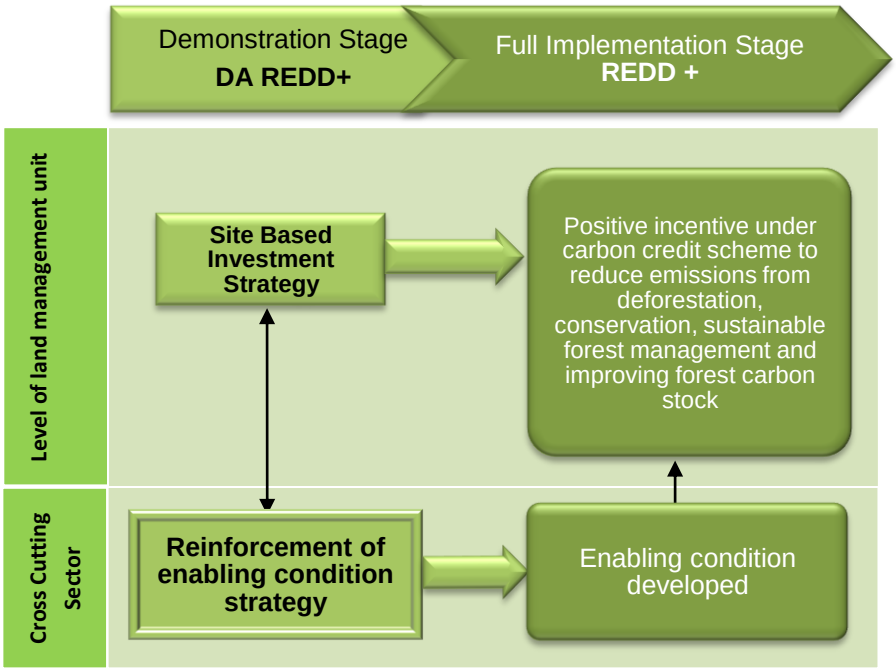


Figure 9. Implementation Strategy of Berau Forest Carbon Program

Basically, REDD+ will be based on two main approaches including policy and positive incentives. The new positive incentives approach shall only be possible as mandatory during the full implementation phase of REDD+.

The main focus of BFCP intervention shall lie on the Enabling Condition Reinforcement Strategy.

The strategy is meant to respond to issues related to the causes and drivers of deforestation and forest degradation as sources of emissions. This cross-sectoral strategy will cover efforts to improve spatial planning and land use, forest management, the involvement of stakeholders, welfare of the community, the development of a sustainable funding mechanism and fair distribution of benefits, as well as the development of a measurable carbon accounting system that can be reported and verified for the reduction of emissions at the national level.

The Site Based Investment Strategy is aimed to develop carbon emission reduction and sequestration models for different types of land in Berau. These models will serve as learning platforms to enhance the full implementation stage. This strategy, which is to be implemented in accordance to the available scale of resources, is aimed at creating footprints for the effort of more substantial emission reductions with further investment.

At the site level, the program will emphasize on the main sector which is forest (Natural production forest, protection forest and supporting sectors (plantation, agriculture and mining)).

The emission reduction program through reduction of deforestation shall be done mainly through intervention in the spatial planning process and optimizing land use outside the forest estate. The emission reduction program that targets reduction of forest degradation will be done mainly on the improvement of management on natural production forest and plantation forest (HTI). While the sequestration and carbon stock enhancement program shall be done through forest conservation and rehabilitation of forest and degraded land.

The basic Strategy of Berau's Forest Carbon Program is aimed at consolidating and improving different efforts and policies on emission reduction originating from deforestation and forest degradation so to have a maximum impact for addressing global warming and assuring sustainable development.

All strategies should be well integrated and mainstreamed according to the development plan and action plan of all parties at all level of the institution.

Reinforcement of Enabling Conditions Strategy

At the district scale BFCP pilot program, the main focus of the intervention program lies on the Enabling Condition Reinforcement Program.

This strategy shall be carried out in a cross-sectoral manner to respond to issues on the causes and drivers of deforestation and forest degradation which constitute the source of emissions.

Reinforcement of Enabling Conditions Strategy will cover:

1. **Improvement of spatial planning and land use planning,**
2. **Improvement of forest management,**
3. **Involvement of stakeholders,**
4. **Promote public welfare,**
5. **Develop sustainable funding mechanism and fair benefit distribution,**
6. **Participate in designing a measurable carbon accounting system, which can be reported and verified for calculating the reduction of emission at national level.**

Details of main activities for each strategy are:

1. Improvement of spatial planning and land use

The process for spatial planning and land use at the village, sub-district and district levels plays a very strategic role in relation to the process for spatial planning and land use at the higher level (provincial, island and national).
BFCP shall encourage the integrated planning process to produce a balanced spatial plan and land use allocation in terms of economic, social and ecology, based on principles of suitability and carrying capacity of the land.

The result of this approach is the formulation of a common agreement from the stakeholders on the improvement of spatial planning and land use that support the low emissions development and prioritizing the use of degraded land for oil palm plantation, plantation forest and other uses.

The main activities endorsing these strategies are:

- Developing a technical assistant unit with the capacity to support the appropriate process of planning in Berau
- Undertaking suitability analyses and research on ecological, economical and social aspects of the district's spatial plan
- Improvement of the district's planning and land use documents
- Preparation and improvement of planning documents at the management unit level
- Capacity building of human resources at the district level down to the village level.

2. Improving of Forest Governance

BFCP will help with capacity building of institutions and communities in Berau, creating and reinforcing the legal framework to endorse a low emission development strategy as well as to promote transparency, accountability and good practices. As part of this strategy, BFCP will endorse the establishment of Forest Management Unit (KPH) in Berau.

The main activities to endorse this strategy are:

- Cooperation with National Forestry Council (DKN) to undertake research and harmonization of regulations with the possibility of setting up an ombudsman.
- Promote transparency, participation, and accountability in the process of legal drafting, policy making and licensing procedures in the forestry sector.
- Promote space for transparency, participation and understanding particularly on community vulnerability to climate change impacts.
- Assuring access to information and accurate data.
- Supporting the establishment and management of a Forest Management Unit (KPH) in Berau.

3. Involvement of multi stakeholders

BFCP will cooperate with the stakeholders of Berau to build understanding and support for low emission development of, including governmental institutions, private institutions and communities.

The stakeholders shall be invited in the planning and implementation of the program. BFCP will abide to the standards developed by The Climate, Community and Biodiversity Alliance for the involvement of stake holders.

The main activities to endorse the strategy are:

- Promote awareness, understanding, support and role of stakeholders on the importance of low carbon development.
- Involvement of stakeholders in the implementation of the program on the site level.
- Implementation of the CCBA (Climate, Community, Biodiversity Alliance) principles in the implementation of the program.
- Implementation of the Free and Prior Informed Consent (FPIC) principles in the implementation of the program, including the commitment to involve women groups
- Database management, information exchange, organization of trainings for stake holders in accordance to their needs.
- Development of a public complaint and conflict resolution mechanism.
- Development of planning and management capacity at village level.
- Preparation of spatial planning programs that is participative and collaborative.

4. Improving public welfare

BFCP will involve the public in designing and implementing the program to make sure the public obtains complete information and completely understands the program. The public will enjoy the benefits from the improvement of management at the village level, promoting the opportunity for income resources from forest monitoring

activities, sustainable forest management, agriculture and agro-forestry and equitable benefit sharing from positive incentive schemes in the future. The benefits will be used to support the improvement of health facilities, education, public infrastructure and services /other services.

This effort will work in approximately 20 villages in the Kelay River and Segah River watersheds and is expected to provide immediate impact for reducing deforestation and forest degradation in these areas. BFCP will encourage cooperation and coordination from all parties and the construction of elements relevant to the efforts to promote social welfare within the targeted area of the program.

The main activities to support the strategy are:

- Facilitate the development and sustainability of land based community forum.
- Undertake socio economic research and survey to identify the need for development assistance and promoting opportunities or capacities of the villages within and surrounding the forest area.
- Develop alternative incomes which reduce the pressures on the environment and support the development of low carbon economy.
- Involvement of the community in the location and sectoral based strategies: (in natural production forest: collaborative forest management, distribution of revenue/profits with concession holders, High Conservation Value Forest (HCVF) joint mapping, setting up of community monitoring; in protection forest: establishment of a community forest monitors, the community as the managers of the protection forest, non-timber forest products utilization; in oil palm plantation: promoting the involvement of community in the plasma land scheme, regulation on revenue sharing, HCVF mapping, more effective monitoring.

5. Developing Sustainable funding mechanism and equitable benefit sharing

BFCP will try to develop a financing scheme in advance, where the majority of funding for the implementation of the five-year pilot phase shall be obtained from donor agencies. BFCP also encourages the acquisition of access to financing through voluntary carbon market mechanisms or performance-based payments to obtain sustainable funding and lastly, BFCP will invest and distribute the funds and benefits obtained to all stakeholders in a fair manner.

The main activities that will support this strategy are:

- Develop a progressive fund-raising scheme and fundraising efforts for the implementation of the pilot phase.
- Develop strategies and mechanisms for engagement with voluntary carbon markets or other programs to facilitate performance-based payments for sustainable funding of the programs. Develop investment and fund distribution scheme so that benefits obtained are distributed to stakeholders in a fair manner during the full implementation phase of REDD +.

6. Participating in the development of a measurable, verifiable, and reportable system, for accounting of emission reductions that is aligned with national level systems

BFCP will support the development of a comprehensive system for evaluating the performance of various aspects, including aspects of carbon accounting, social and environmental safeguards as well as financial mechanisms. REDD + is a performance-based concept so measurement of BFCP carbon emissions activities at the district level will be very important.

The Reference Emissions Level/Reference Level (REL/RL) in the district will be developed based on a thorough analysis of historical data and the main drivers of deforestation in the future.

This program also will apply a solid and trustworthy system of measurement, reporting and verification (MRV) by considering leakage factors and other issues. An accounting framework for estimating carbon emissions and sequestration in Berau shall be part of the national accounting systems, which is still in the development stage. All emission reductions shall be verified independently by third parties using the standards and practices recognized by the international community.

The main activities that will support this strategy are:

- Develop a comprehensive system to monitor and evaluate the performance of various aspects, including carbon, social, environmental and financial indicators.
- Develop a mechanism for measuring emissions reference levels in Berau and comprehensive analysis of historical data and the main drivers of deforestation in the future.
- Provide active support for the development and implementation of solid and trusted measurement, reporting and verification systems. Facilitate the development and sustainability of community-based landscape forums.

Site Based Investment Strategy

The Site-Based Investment Strategy shall aim at developing carbon emission reduction and sequestration for a number of different types of land management in Berau, according to the scale of available resources, with the purpose of creating a footprint for more substantial emission reduction efforts with further investment.

At the site level, the program shall give emphasis on key sectors of the forestry sector (natural production forest and protection forest) and supporting other sectors (plantations, agriculture and mining). Forest carbon emissions reduction programs shall target decreasing deforestation rates and shall be implemented mainly through interventions on spatial planning and land use optimization of forested areas outside natural production forest.

Forest carbon emissions reduction through decreasing the rate of forest degradation will be mainly carried out through improved management of natural production forests.

The program on carbon sequestration shall be carried out through forest conservation, ecosystem restoration and rehabilitation of degraded forests and lands.

Site Based Investment Strategies shall include:

1. **Improving management of natural production forest on an area of at least 650,000 ha with a potential reduction in emissions by three (3) million tons of CO2e over the next five years,**
2. **Improving management of protection forest on an area of at least 100,000 ha and a potential of emissions reduction and carbon sequestration of two (2) million tons of CO2e over the next five years,**
3. **Improving land use planning and management of oil palm plantations on an area of at least 20,000 ha with a potential reduction in emissions by seven million tons of CO2e over the next five years,**
4. **Improving land use planning and management of mangrove areas.**

Details of main activities per-each strategy are as follow:

1. **Improving natural production forest management in at least 650,000 ha with a potential emission reduction of 3 million tons of CO2e over the next five years**

BFCP will cooperate with the concessions of natural production forest (IUPHHK-HPH) in Berau to promote low emissions timber management practices and provide assistance on legal and technical aspects.

Natural forest concessions will be targeted to comply with government requirements for certification in sustainable forest management (SVLK), while some concessions will hopefully obtain “Well Managed Forest” certification from the Forest Stewardship Council (FSC) under their own initiative.

BFCP also will help with the establishment of a pilot Forest Management Unit (KPH) to improve and define the roles and responsibilities of government, the private sector and communities in forest management.

In addition, if the opportunity and resources are available, forest areas with high conservation value will be promoted for sustainable management, not timber production. The areas will be promoted as units with ecosystem restoration and protection functions.

The development activities of plantation forest will be directed towards establishment on severely degraded forest areas, especially open areas and shrub

lands, as well as planning and protecting areas of high conservation value. In addition, plantation forest managers will be encouraged to develop a more environmentally friendly plantation forest, such as, land clearing without fire, land management practices to reduce the risk of soil erosion and land compacting.

The main activities that will support this strategy are:

- Identify and obtain commitments from natural forest concession permit holders who will be involved in the program.
- Identify and encourage the development of activities to enhance forest carbon stocks in natural production forest.
- Provide technical support for the efforts to acquire SVLK and FSC certification
- Promote policy support from central government for Reduced Impact Logging (RIL) practices in the management of forest.
- Promote and obtain commitment from the natural forest concession permit holders for management changes at the production level to implement RIL practices in the management of natural production forest.
- Develop Learning Action Networks (LAN) and a Forestry Training Centre.
- Assist the attainment of better financing access for permit concessions holders who are committed to improve forest management.
- Review and initiate opportunities for the development of areas for ecosystem restoration or other protection functions.

2. Improving protection forest governance in at least 100,000 hectares and reduce emissions and enhance carbon sequestration with the potential of 2 million tones of CO2e over the next five years

Berau has a protected forest area of 362,016 ha. Illegal logging is now a major threat to the protected forest areas. BFCP will promote the establishment of integrated forest conservation planning for all areas of the protected forest, aiming at increasing carbonsequestration, conservation of biodiversity, and the provision of environmental services. Conservation efforts in protection forest also include special ecosystems such as karst, which has high social, cultural and environmental conservation values.

BFCP shall promote the improvement of regulations and policies at the district, provincial and national levels for the conservation of protected forests. BFCP will also develop strategies and concrete measures to guarantee the sustainable financing of the conservation efforts of protected forest in Berau.

The main activities that will support this strategy are:

- Collaborate to formulate and develop policy, legal and institutional management frameworks of the protective forest.
- Identify and encourage the development of activities that can enhance carbon sequestration in protection forest.

- To review and analyze protection forest areas, especially those areas with high levels of biodiversity, high carbon stocks and hydrological values, and to identify areas that have substantial threats.
- To map the pattern of intervention, partnership, management responsibilities, incentive structures, legal mechanisms, sources of funding and implementation schedule for the preparation of integrated conservation plans and strategies of the protective forest areas.
- Identify programs that can be implemented to reduce emissions and increase carbon sequestration in protection forest.
- Support the development of management models for protection forest for the Berau KPH Model.
- Support planning and conservation efforts, especially in protected areas of Lesan River watershed and protection forest areas that have the karst ecosystems.
- Develop strategies and concrete measures to guarantee sustainable financing of protective forest conservation.
- To initiate the development of conservation plans and strategies at the district level.
- To initiate the development of conservation management mechanisms, both in protection forests, and its surroundings.

The West Berau Forest Management Unit (FMU) and its Strategic Role in the Context of BFCP

Through the Decree of the Minister of Forestry Number: SK.649/Menhut-II/2010 of November 22, 2010, the West Berau Production Forest Management Unit (KPHP) was established in Berau, East Kalimantan province covering an area of 775 539 ha, with the following details:

a. Protection forest area 247 025 ha
b. Limited Production Forest area 410 253 ha
c. Permanent Production Forest area 118 261 ha

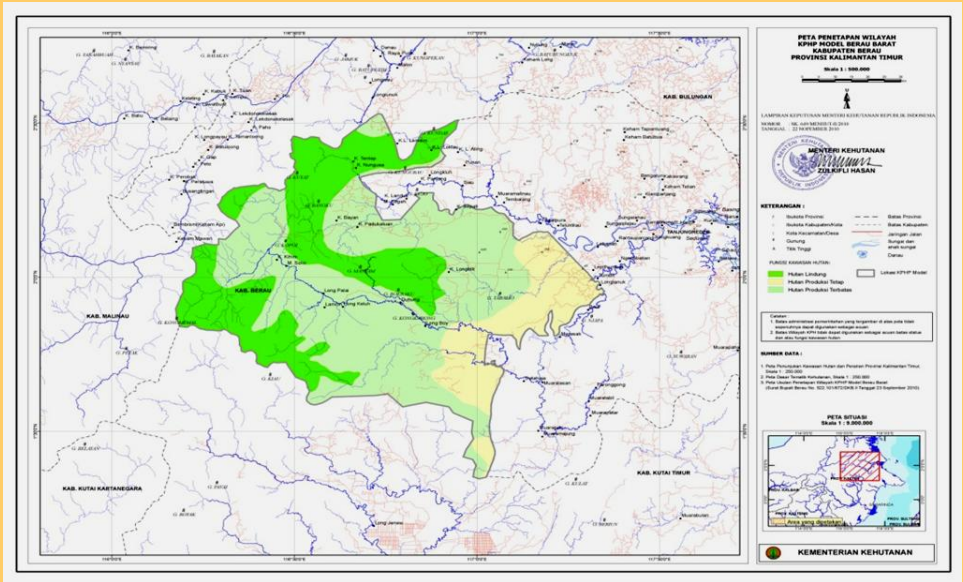


Figure 10. West Berau Forest Management Unit

The organization and working procedures of the FMU shall be developed in accordance with the directives of the Minister of Home Affairs Regulation No. 61 of 2010, which was issued on December 23, 2010. The FMU will carry out these functions:

a. implementation of forest management in the unit that includes administration and forest management planning, forest utilization, use of forest areas, forest rehabilitation and reclamation, forest protection and nature conservation;
b. elaboration of forest policy at national, provincial and district level to be implemented in its respective territory;
c. implementation of monitoring and assessment of forest management activities in the region; and
d. facilitating investment opportunities in order to support the achievement of forest management objectives in the region.

By mapping the roles and relationships of each party (the holder of a concession license, manager / management, regulators, local community stakeholders, the relation between local and central government) in the forest landscapes and forest production, such formation and development of the KPH is a very strategic institutional breakthrough for BFCP. In this manner the strategic programs of BFCP can be better implemented through and in cooperation with the West Berau FMU model, both in production forests (natural production forest and plantation forest) and the protection forest.

3. Improved land use planning and management of oil palm plantations in at least 20,000 hectares with a potential emission reduction of 7 million ton of CO2e over the next five years

BFCP will help map out the locations most suitable for the development of oil palm plantations which will then be integrated into land use planning policy. BFCP would encourage as much as possible the formation of an agreement for the relocation of oil palm plantations from forested areas into areas that have been degraded outside the forest estate (APL). This program will be developed to increase efficiency of oil palm production, reduce the negative impacts on biodiversity and environmental services and increase community benefits. BFCP will also encourage government, private sector and communities to promote awareness and support for the development of a sustainable palm oil plantation in Berau.

The main activities that will support this strategy are:

- To review and analyze areas most suitable for the development of oil palm plantations.
- Working with licensees and local governments to assess the possibility of re-classification and transfer the development of plantations to the critical or degraded land areas, especially for those which have not been approved or are not yet in production
- Provide technical support and capacity building for plantation managers in efforts to comply with Roundtable on Sustainable Palm Oil (RSPO) criteria and Indonesian Sustainable Palm Oil (ISPO).
- Develop cooperation between oil palm plantation estate company with various parties to minimize the ecological impact of the production systems.

- Develop a forum or space for discussion on issues related to oil palm plantation at the district level.

4. Improving land use planning and management of the mangrove areas

Most of Berau mangrove areas (more than 65%) are in the forest estate (KBK).

The parties involved in the management of mangrove areas are District agencies of Forestry, Fisheries, DKP and Environment. Until now there has been no effort to integrate management of mangrove areas. Improved management of mangrove areas also can provide a positive impact on efforts to reduce emissions.

BFCP encourages improved management of mangrove areas through reclamation of critically degraded mangrove areas, promoting public awareness on environment, improvement of timber utilization through sustainable coppice systems, creation of buffer belts for mangroves to protect the community's fish farming areas from sea abrasion, and creating alternative income sources for coastal communities.

Improved management of mangrove forests in Berau is expected to provide benefits in relation to both issues, from the potential of carbon itself and from other potentials.

The main activities that will support this strategy are:

- Research on the condition, status and problems faced in mangrove areas.
- Streamlining management responsibilities among relevant agencies.
- Informing the public on existing policies and enhance law enforcement efforts.
- Encourage the integration of an initiative for setting up a Mangrove Information Center (PIM) in the program.
- Perform mangrove rehabilitation efforts in damaged areas and encourage the development of environmentally friendly fish farming.

4. Program Management Structure

The program management structure is designed in a simple way for the pilot phase of the program. The structure will be prepared in stages and operational in the full implementation phase.

The management structure of the program is designed with consideration to national policies relating to REDD+. It is expected to be able to support the implementation of a coordinated and effective low emission development strategy, which is responsive to the various inputs from different groups of stakeholders It is also expected to be able to ensure transparency and accountability in fund management and in the long term be able to build strong institutional capacity and human resources with sustainable funding for the implementation of REDD + programs in Berau.

The organizational structure of the program management is as follows:

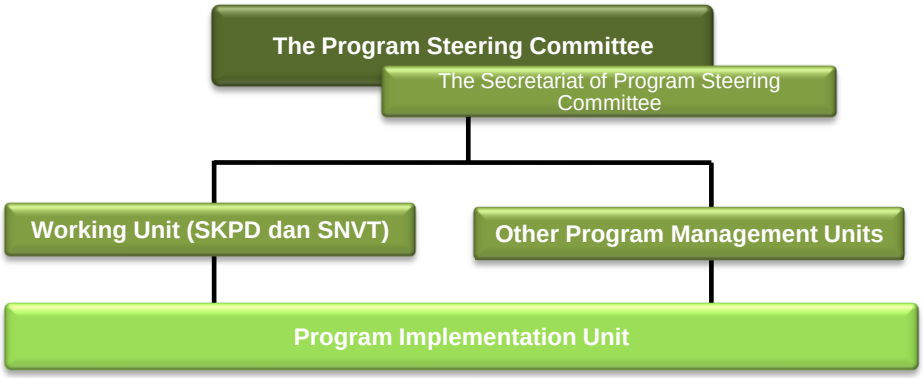


Figure 11. Organizational Structure of the BFCP's Program Management.

Program Steering Committee

The Program Steering Committee (SC) is the highest level of authority within the BFCP management scheme. The Steering Committee will be directly led by head of the Berau district and other officials of the district level working units. The Steering Committee will also be supported by director-level appointees from the National Planning Agency, and each of the Ministries of Foreign Affairs, Forestry, Environment, as well as the Assistant Governor of East Kalimantan.

This composition of the membership is expected to provide coherent space for coordination between the different levels of government in supporting the district scale REDD+ pilot program in Berau. In performing its duties, the Program Steering Committee may set up a Secretariat of the Steering Committee.

The Program Steering Committee has the following task:

1. Encourage the integration of Berau Forest Carbon Program as an integral part of Berau District development plans, as well as at the provincial level of East Kalimantan and at the national level, in efforts to reduce emissions from deforestation and forest degradation as well as to increase forest carbon stocks through sustainable forest management, forest conservation, restoration of ecosystems and forest rehabilitation;
2. To coordinate with relevant stakeholders of the Berau Forest Carbon Program at the district, provincial, national and international level;
3. To coordinate and provide guidance for the establishment of program management units;
4. Developing an instrument of coordination between the program management unit, through periodic coordination meetings;
5. Setting the policy guidelines; strategic planning, guidance, supervision, and evaluation of the implementation of the Berau Forest Carbon Program;
6. Issue approval for program proposal under the umbrella of BFCP through the NOL (No-Objection Letter) from the program management units;
7. Note: The Program Steering Committee is not involved in the management of funds of the Berau Forest Carbon Program.

The Secretariat of the Program Steering Committee has the following tasks:

1. Provide technical and administrative support to the activities of the Program Steering Committee;
2. Assisting the Program Steering Committee in formulating policy and strategic plan and program monitoring;
3. Assisting the Program Steering Committee in coordinating with relevant program stakeholders at district, provincial, national and international level;
4. Assisting the Program Steering Committee in coordinating the program management units, through periodic coordination meetings.

Program Management Unit

The program management units may differ from one to another depending on their source of funding and funding mechanisms. However, in general, there will be three possible financing schemes for the program, including: on-budget & on-treasury, on-budget and off-treasury, or off-budget and off-treasury.

Thus, the program management unit will be divided into work units consisting of SKPD (the district working units),SNVT (Specific Non-Vertical Unit), and Other Program Management Unit.

The unit program manager must apply for NOL (No-Objection Letter) to the Program Steering Committee for each program proposal. For the issuance of NOL, the Program Steering Committee will conduct a review to the proposed program based on the BFCP Strategic Plan.

The Working Units (SKPD or SNVT)

These program manager units shall manage the funds from the state budget/regional state budgets and foreign assistance under the scheme of on-budget & on-treasury. Regional working units (SKPD) at the district level which will be directly involved in the implementation of the program strategies shall include those with the authority in planning, forestry, plantation, mining, community development and spatial planning.

The involvement of local working units is to ensure the integration of BFCP with local government development plans in the short term (annual), medium and long term.

The Specific Non Vertical Unit (SNVT) is a working unit established by the Ministry or State Institution specifically for the implementation of assistance programs and has a separate budget management structure.

Other Program Management Units

Other program management units are set up to manage programs under the off-budget & off-treasury financing mechanism, which mainly function to receive from aid donors.

Since the management characteristics are different for each project, each form of cooperation may develop its own independent program management unit. Development of this type of program management unit needs to be coordinated and to consider the guidelines from the Steering Committee.

In the medium term, BFCP will encourage the establishment of a Forum/Fund Partnership which will be a platform for synergy, coordination and consolidation among the providers of financial support and / or technical assistance or other assistance for the implementation of forest carbon program in Berau.

In the full implementation phase of the program, the instrument for coordination among program management units will be developed and facilitated by the Program Steering Committee through the mechanism of periodic coordination meetings.

Program Implementation Unit

The Program Implementing Unit is a unit that will act as executor of activities, both for strategy at the site level and cross-sector strategy.

Local organizations/stakeholders that may support the BFCP include: Institute for Community Empowerment at village level (LPM), Regional Technical Implementation Unit (UPTD), NGOs, consultant/sub-contractors and land managers who are involved in the implementation of various BFCP strategies.

Land managers include the holders of IUPHHK, manager of Forest licensee, Indigenous Forest manager, KPH and local governments. In the context of the BFCP implementation, land managers can act as initiators and executors in accordance with regulations issued by the Ministry of Forestry related to the implementation of REDD+ in Indonesia.

5. Fund Management Structure

Funding Sources

Sources for BFCP financing this phase may come from the State Budget (APBN), Regional Budget (APBD), private investment (banking and non-banking), corporate social responsibility (CSR) funds, or foreign funding as aid / grants, either in the form of bilateral or multilateral cooperation and assistance from donor agencies / individuals / communities.

The funding for BFCP may not come from public or private debts.
BFCP will also identify the possibility of developing strategies and mechanisms for engagement with voluntary carbon markets or other voluntary offset programs to facilitate performance-based payments for sustainable funding.
The existence of the Forum / Partnership Fund in the medium term is also expected to become a place for synergy, coordination and consolidation among the providers of financial support and technical assistance or other assistance for the implementation of forest carbon program in Berau.

Funding Schemes

The type of funding source will influence the form of the funding scheme to be used. There are three alternative financing schemes (Fig 12):

a. *On-budget & on-treasury*, in which donors use the government financial regulatory system of Indonesia in the provision of funds;
b. *On-budget and off-treasury*, where funds are given outside the State Treasurer management scheme (KPPN), but the funding still must be reported to the government budget system; and
c. *Off-budget and off-treasury*, where the donor does not use the Indonesian government's budget system and does not provide funds through the Treasury Office.

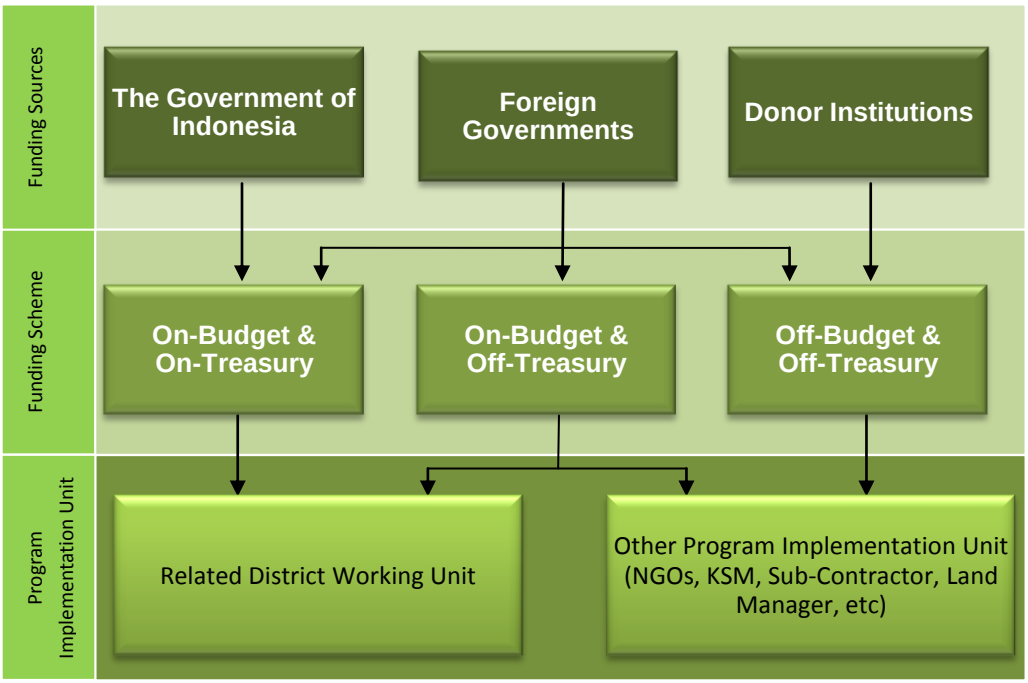


Figure 12. Funding Scheme of Berau Forest Carbon Program

Funding Distribution Options

For funds received under the Indonesian Government budget registering system (on-budget) the disbursement of the funds for the Implementation Unit shall be done in accordance with state financial laws and regulations.

As for funds that are not under the Indonesian Government budget registering system (off-budget) the distribution of the funds for the Implementation Unit can be done through one of the grant options in accordance with prioritization of the program's main strategies as follows:

a. Grants for reinforcement of enabling conditions, the funds may be channeled to NGOs, consultants, sub-contractors, etc.;
b. Grants for Site-Based Investment Strategies are channeled for communities and land managers in both forest areas and other use areas;
c. Grants for Consultation, Coordination and Facilitation.

Each Program Management Unit will develop fund channeling systems that will ensure the principles of transparency and accountability, particularly on the criteria of candidates for receiving the funds, the process of receiving proposals, the selection / review of proposals, the process of monitoring and oversight of program implementation.

	Logical Intervention	Objectively Verifiable Indicators of Achievements (OVIs)	Verification Sources	Assumptions and Risks
BFCP Goals 2011 – 2015	**The District of Berau as a development model based on low emission sustainable natural resources management.**	• Planning promotion and improvement, especially in relation to spatial planning, land use planning, and licensing procedures at the district level. • Ten million tones of CO2 emission within the period of five years particularly in the forestry sector and land use change are reduced, and carbon sequestration will be increased. • Welfare of 5,000 people of local communities living within and surrounding the forest area is increased. • The high valued ecosystem, biodiversity and function of the watershed areas on at least 400,000 ha along the Kelay and Segah rivers and the surrounding habitat of some 1,500 Kalimantan's orangutans are protected. • Public institution capacity is improved particularly related to the high standard performances, financial and human resource aspects. • Lessons learned and replication of the pilot implementation of REDD+ at the level district to the national and international are developed.	Result of the MRV (*Measurable, Reportable and Verifiable)* – system	• Strong political and policy endorsement at the district, provincial, national as well as international level. • Strong commitment, participation and collaboration from all relevant parties and stakeholders, particularly from the local district government. • Sufficient and secured operational support for the program (finance support, human resources, access, data, technology, etc).

	Logical Intervention	Objectively Verifiable Indicators of Achievements (OVIs)	Verification Sources	Assumptions and Risks
Strategy Outcome: Reinforcement of Enabling Conditions	**Achievement of Enabling Conditions for the implementation of REDD+ in Berau District**	• Spatial planning and land use planning are improved • Governance in the forestry sector is improved. • Involvement of stakeholders is established • Communities' welfare is improved • Sustainable finance mechanism and fair distribution of benefits are created. • The developments of monitoring systems that are Measurable, Reportable, and Verifiable for the calculation of emission reductions at the national level are available.	Result of the MRV (Measurable, Reportable and Verifiable) system	• Strong political and policy endorsement at the district, provincial, national as well as international levels. • Strong commitment, participation and collaboration from all relevant parties and stakeholders, particularly from the local district government • Sufficient and secured operational support for the program (finances, human resources, access to , data, policies, finance, technology, etc)
Output 1	**Improvement of spatial planning and land use**	• Integrated planning process framework is developed. • Spatial planning based on balanced ecological, economic and social considerations. • The capacity of stakeholder involvement in planning and implementation of plans is developed. • The concept of REDD+ in the regional spatial plan is internalized.	• Result of the MRV system • Integrated planning process framework • Regional spatial planning	• Strong commitment, participation and collaboration from all relevant stakeholders, particularly from forest government agencies and management units related to planning.

	Logical Intervention	Objectively Verifiable Indicators of Achievements (OVIs)	Verification Sources	Assumptions and Risks
Main Activities	1. Develop technical assistance programs able to sufficiently support Berau's planning process. 2. Undertake analysis and research on incorporating ecological, economical and social aspects in the district's Spatial Plan. 3. Improvement of the planning document at the district level and allocation of land use areas. 4. Preparation and improvement of the planning document at the management unit level. 5. Capacity building of human resources at the district, sub district, and village levels.			
Output 2	**Improvement of governance in the forestry sector**	• Capacity building programs for public and community institutions in Berau are established. • Enabling framework of laws and regulations to support low emissions development are created. • Transparency, accountability and good governance practices are improved. • Forest Management Units (FMU) in Berau are established.	• Result of MRV • Legal and regulatory framework to supportthe low emissions development strategy • The establishment of a Forest Management Unit	• Strong commitment, participation and collaboration from all relevant parties and stakeholders • Support from the provincial and central government on FMU development in Berau
Main Activity	1. Cooperating with National Forestry Council (DKN) to undertake research and synchronization of regulations and to study the possibility of establishing an ombudsman 2. Promoting transparency, participation and accountability in the process of drafting regulations, policy and licensing in the forestry sector. 3. Promoting space for transparency, participation, and understanding, particularly for key stakeholders 4. Strengthening institutions and NGOs. 5. Support the establishment and management of FMU model in Berau			

	Logical Intervention	Objectively Verifiable Indicators of Achievements (OVIs)	Verification Sources	Assumptions and Risks
Output 3	**Active involvement of stakeholders takes place**	• The awareness, understanding, and support for low carbon development are facillitated. • The involvement of stakeholders in the process of designing and implementating the program is initiated. • The participation of stakeholders is according CCBA standards. • A process of Free Prior and Informed Consent(FPIC) is developed and maintained.	• Result of the MRV system • Concept and guidance for the implementation of CCBA principles • Concept and guidance for the implementation of FPIC principles	• Strong commitment, participation and collaboration from all related stakeholders • Support from the provincial and central government to accommodate the principles of FPIC in the legal framework
Main Activity	1. Promoting awareness, understanding tosupport the role of stakeholder involvement in low carbon development. 2. Involvement of stakeholders in the implementation of the program at the site level. 3. The implementation of the CCBA (Climate, Community, and Biodiversity Alliance) principles in the implementation of the program. 4. The implementation of the FPIC principles in the implementation of the program, including the commitment for the involvement of women's groups, through activities such as: preparation of simple manuals about FPIC, facilitating learning and information sharing opportunities to ensure that sufficient information is available for important decision making, and the integration of the FPIC into the analysis process on the impact to environment and social aspects. 5. The management of the database, exchange of information and the organization of training according to the needs of the stake holders. 6. Developing mechanisms for public complaints and resolution of conflicts between parties. 7. Developing capacity for planning and management at the village level. 8. Preparation of sustainable planning program in a participative and collaborative manner.			
Output 4	**Increasing welfare of the people who reside in and around forest areas**	• Communities' income and alternative livelihoods to reduce pressure on the environment in the short, medium and long term are increased. • Number of families who have access to good water for domestic consumption, sanitation system and electricity are increased • Number of children completing primary and lower secondary education are increased. • Number of maternal deaths and child	• Result of the MRV system • Result from surveys, research and analysis	• Strong commitment, participation and collaboration from all parties and stakeholders, especially people living in and around forest areas and other land managers

	Logical Intervention	Objectively Verifiable Indicators of Achievements (OVIs)	Verification Sources	Assumptions and Risks
		mortality are reduced. • Replications of learning mechanisms for the community involvement in the BFCP are documented. • Fair and equitable benefit-sharing arrangements for the village community are established.		
Main Activity	1. Facilitate the development and sustainability of landscape-based community forums 2. Conduct studies and socio-economic surveys to identify needs for increased development assistance or capacity building opportunities in villages in and around forest areas 3. Develop livelihood options that reduce pressure on the environment and support the development of low-carbon economy. 4. Involvement of the community in the sectoral and location-based strategies: (regarding natural production forests: collaborative forest management, sharing revenue / profit by the concession holder, collaboratively mapping HCVFs, formation of community monitoring programs; regarding protection forests: enabling the community as forest managers, the utilization of non-timber forest products; regarding oil palm plantations: improving the involvement of the community in the plantation land scheme, revenue-sharing arrangements, mapping HCVFs, and more effective monitoring)			
Output 5	**Establishment of sustainable funding mechanisms and equitable benefit-sharing**	• Funding sources scheme for financing the implementation of a five-year pilot phase is developed. • Formulation of voluntary carbon market or performance-based payment mechanisms for obtaining sustainable funding is developed. • Investment schemes to ensure the fair distribution of funds and benefits to all stakeholders are established	• Results of the MRV Systems • Fundraising scheme • Concepts, formulations and mechanisms of sustainable program funding • Investment schemes and the distribution of benefits • Results of fundraising	• Strong commitment, participation and collaboration from all parties and stakeholders • Support from national and international donor agencies for the implementation of the pilot phase of the program
Main Activity	1. Developing fund-raising schemes and progressive fundraising efforts for the implementation of the pilot phase 2. Develop strategies and mechanisms for engagement with voluntary carbon markets or other programs to facilitate performance-based payments			

	Logical Intervention	Objectively Verifiable Indicators of Achievements (OVIs)	Verification Sources	Assumptions and Risks
	for sustainable funding of the programs 3. Develop an investment scheme to ensure the distribution of funds and benefits will be received by stakeholders in a fair manner for the full implementation phase of REDD+			
Output 6	**The development of monitoring systems that are Measurable, Reportable and Verifiable for the calculation of emission reductions at the national level**	• Comprehensive systems for evaluating the performance of various program aspects, including aspects of carbon, social, environmental and financial are established. • Mechanism to measure the level of reference of emissions in Berau and a thorough analysis of historical data and the main drivers of deforestation in the future are established. • Active support for the development and implementation of strong and reliable measurement, reporting, and verification systems are established.	• Results of the MRV Systems • Monitoring and evaluation system • Instructions and measurement guidelines	• Strong commitment, participation and collaboration from all parties and stakeholders Progress development • National level MRV system
Main Activity	1. Develop comprehensive systems to monitor and evaluate the performance of various program aspects, including forest carbon emissions, social, environmental, and financial. 2. Develop mechanisms for measuring reference levels of forest carbon emissions in Berau, and a thorough analysis of historical data and the main drivers of deforestation in the future. 3. Provide active support for the development and implementation of strong and reliable measuring, reporting, and verification systems			
Strategy Outcome: Site Based Investments	**Implementation of emission reduction and increase in carbon sequestration of about 10 million tons of CO2e over a period of five years, particularly from forestry and land use change through location-based investment**	• The management in natural production forest on an area of at least 650,000 ha is improved, resulting in potential reduction in emissions by 3 million tons of CO2e over the next five years. • The management of protection forest on an area of at least 100,000 ha is improved, resulting in potential reduction in emissions and increase carbon sequestration with the potential of 2 million tons of CO2e over the next five	• Result of the MRV system (Measurable, Reportable and Verifiable)	• Strong political support at the district, provincial, national and international levels, that results in relevant policies • Strong commitment, participation and collaboration from all parties and stakeholders,

	Logical Intervention	Objectively Verifiable Indicators of Achievements (OVIs)	Verification Sources	Assumptions and Risks
		years. • Land use planning and management of oil palm plantations are improved on an area of at least 20,000 ha,resulting in potential reduction in emissions by 7 million tones of CO2 over the next five years. • Land use planning and management of mangrove areas are improved.		especially from local district government • Adequate and assured operational support for the program (support on funding, human resources, access to information, policies, finances, data, technology, etc.)
Output 1	**Improved management of natural production forest on an area of at least 650,000 ha with a potential reduction in emissions by 3 million tons of CO2e over the next five years**	• Government requirements for mandatory concession certification in sustainable forest management (SVLK-PHPL) are achieved, some concessions obtain certification from the Forest Stewardship Council (FSC) under their own initiative are fulfilled. • The governance of natural production forest is improved. • Concessions that are intended for ecosystem restoration or other protection functions are developed.	• Result of MRV System	• Strong commitment, participation and collaboration from all parties and stakeholders
Main Activity	1. Identify and obtain commitments from natural forest concession permit holders who will be involved in the program. 2. Identify and encourage the development of the activities to reduce emissions and increase sequestration in natural production forest. 3. Provide technical support for the acquisition of SVLK and FSC certification. 4. Gain support from central government to enhance policy for the practices of RIL in natural production forest management. 5. Promote and obtain commitment from the natural forest concession permit holders for management changes at the production level to implement RIL practices in the management of natural production forest. 6. Promote a Learning Action Network and a Forestry Training Centre. 7. Help acquire/ access better financing for natural forest concession permit holders that are committed to improving management. 8. Review and initiate opportunities for developing ecosystem restoration or other protection activities.			
Output 2	**Improved forest management of at least 100,000 hectares with the potential to reduce emissions and increase carbon**	• Policies and laws that support effective conservation activities are developed.	• Result of MRV system	• Strong commitment, participation and collaboration from all

	Logical Intervention	Objectively Verifiable Indicators of Achievements (OVIs)	Verification Sources	Assumptions and Risks
	sequestration of 2 million tones of CO2e over the next five years	• Integrated conservation plans and strategies, including identifying areas with high conservation value are established. • A special conservation plan for karst ecosystems is developed.		parties and stakeholders
Main Activity	1. Collaborate to formulate and develop legal, institutional and managerial policy frameworks for protectionforest. 2. Identify and encourage the development of activities to enhance carbon stocks in protection forest. 3. Review and analyze protection forest areas, especially those with high levels of biological diversity, carbon storage and hydrological values, and identify areas that are under substantial threat. 4. Mapping the pattern of intervention, partnership, management responsibilities, incentive structures, legal mechanisms, sources of funding and implementation schedule for the preparation of plans and strategies of an integrated conservation of protective forest areas. 5. Identify programs that can be done to reduce emissions and increase carbon sequestration in protective forest areas. 6. Support the development of management models for protection forest in the Berau Forest Management Unit (FMU). 7. Support planning and conservation efforts, especially in the protection areas of Lesan River and the protection forest that has karst ecosystems therein. 8. Develop a strategy and concrete measures to guarantee the efforts of sustainable financing of protective forest conservation. 9. Initiate the development of plans and conservation strategies at the district level. 10. Initiate the development of conservation management mechanisms, both in protection forests and outside the protection forest.			
Output 3	**Improved land use planning and management of oil palm plantations on an area of at least 20,000 hectares and with a potential reduction in emissions by 7 million tons of CO2e over the next five years**	• Support is received for low emission oil palm plantations from all stakeholders, particularly government and industry . • The most appropriate locations for the development of oil palm plantations is identified on degraded lands. • Areas with high conservation value are protected in accordance with the criteria HCVF ISPO and RSPO. • The capacity of land managers in identifying and managing areas of high conservation value oil palm plantations is improved. • Forums or discussion rooms on oil palm - related issues at district level are actively conducted.	• Result of the MRV system	• Strong commitment, participation and collaboration from all relevant parties

	Logical Intervention	Objectively Verifiable Indicators of Achievements (OVIs)	Verification Sources	Assumptions and Risks
Main Activity	1. To review and analyze potential land use most suitable for the development of oil palm plantation. 2. Working with licensees and local governments to assess the possibility of re-classification and transfer of plantation development to a critical or degraded land, especially for areas where plantation licenses have not yet been approved or are not yet in production. 3. Provide technical support and capacity building for oil palm plantation managers in efforts to comply with the RSPO criteria and ISPO. 4. Develop cooperation between oil palm plantation companies with various parties to minimize the ecological impact of production systems. 5. Develop forum or space for discussing oil palm-related issues at the district level.			
Output 4	**Improved land use planning and management of mangrove areas**	• Baseline data and information on mangrove areas in Berau are established. • Integrated management of mangrove areas among different related agencies is established. • The initiative of setting up Mangrove Information Center (PIM) in the program is integrated. • The concept and implementation of an Integrated Coastal Zone Management, through facilitating the interests and activities of all parties at the planning level, by maintaining the balance the community's economic, environmental and socio-cultural aspects is developed.	• Result MRV system	• Strong commitment, participation and collaboration of all related stakeholders
Main Activity	1. Conducting research on the condition, status and threats faced in mangrove areas. 2. Building a media for management integration between relevant agencies. 3. Disseminate information on existing policies and enhance law enforcement efforts. 4. Encourage the integration of an initiative for setting up a Mangrove Information Center (PIM) in the program. 5. Mangrove rehabilitation efforts in areas that have been damaged and encourage the development of environmentally friendly fish farmings.			

CEEweb for Biodiversity

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Dear Executive Secretary, Dear Ahmed, **Budapest, 31.07.2011**

In CBD Decision COPX/3, §8(c), COP 10 invited Parties, relevant organizations and initiatives, such as the World People's Conference on Climate Change and the Right of Mother Earth, to submit information to the Executive Secretary concerning innovative financial mechanisms that have potential to generate new and additional financial resources as well as possible problems that could undermine achievement of the Convention's three objectives. (Ref: SCBD/ITS/YX/75558)

CEEweb for Biodiversity has assessed the available information – and whereas possible information available on the application of various Innovative financial Mechanisms – and would like to submit the following information and recommendations for the consideration of the Executive Secretary.

1) Regardless the nature or the type of the IFM´s, it must be consistent with the CBD and the delivery of its objectives, such as the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising from the utilization of genetic resources. Any IFM may not have any direct or indirect negative affect on biodiversity.

2) In order to safeguard this principle "sustainability check" should be carried out for each IFM in question. Such assessment will include consideration of:
    a. How the finances are generated (having negative impact elsewhere)?
    b. Does to use of the finances contribute directly or indirectly to nature distraction? (Increased exploitation, movement of goods and people, etc.)
    c. How long is the mobilised resource available - what does the availability in time depends on – and how does it relate to the biological cycles it is supposed to have a positive impact on?
    d. How does the IFM vulnerable to market forces?

3) The needs for new and additional resources must be scrutinised – primarily assessing the new and/or revised NBSAPs. It should be avoided that while a country / region is directly or indirectly increasing the pressure on biodiversity on the one hand, it would indicate and spend ever increasing resources for the protection of biodiversity on the other hand. This spiral needs to be broken down.

4) Safeguards needs to be in place prior to the implementation of any IFM – and this should include social, economic but governance measures as well.

5) The trend of increasing environmental pressure is increasing, thus it is predictable that in order to compensate it increasing resources will be needed. In order to move ahead with the effective and predictable implementation of the CBD´s objectives an early phasing-out strategy

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of resources (instead of ever increasing demand) would need to be in place as a guarantee for sustainability.

6) Donor countries and communities must have the security from the recipient constituency when considering the implementation of various IFM schemes, which the sustainability assessment has been carried out, appropriate governance structure, and last but not least the absorption capacity is in place.

7) The existing examples of IFMs and the ones which are being developed needs to be scrutinised both by the national and international community in order to understand its functioning in different environments and to develop appropriate safeguards prior its eventual implementation.

8) Parties should assess how various IFMs have been implemented and how they have contributed to the CBD objectives and request the CBD Secretariat to prepare implementation guidelines for the consideration and decision of the Parties.

9) The various IFMs should be treated systemically – they should not only address specific problems but also overarching issues which lead to biodiversity decline. Thus they should eventually regulate the resource use and in effect decrease the pressure on ecosystem services. The IFMs should also pre-empt eventual and arising problems.

10) The resources created and mobilised through IFM should be generated from unsustainable use of resources and lead towards sustainable use.

11) Financial resources always – directly or indirectly – lead to utilisation of resources and energy – which are contributing to environmental pressures. Thus, when designing the IFMs they should be only active until the objectives are reached and the balance between positive contribution to biodiversity and negative environmental pressures is not shifting towards more pressures and less environmental benefits.

Dear Executive Secretary, we sincerely hope that our thoughts and ideas contribute to the extremely important discussion and development of the IFMs which will lead eventually the fruitful discussion and decision by COP11.

Sincerely yours,
Andras Krolopp, Senior Policy Adviser

IFRIK

Submission to the CBD Secretariat according to Decision X/3, A. paragraph 8(c) by the NGO EcoNexus, July 2011

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Information concerning innovative financial mechanisms

With Decision X/3, A, paragraph 8(c) "invites parties, relevant organisations and initiatives [...] to submit information concerning innovative financial mechanisms that have potential to generate new and additional financial resources as well as possible problems that could undermine achievement of the Convention's three objectives [...]".

This submission focuses on experiences with offset programmes, showing examples and concerns that have arisen from them and that are relevant to ideas of developing biodiversity offset systems or similar mechanisms.

1 Introduction

In the UN Framework Convention on Climate Change (UNFCCC), a market approach was built into the Kyoto Protocol from the start. Now within the CBD, the model presented for biodiversity is that of the carbon market. But there are major problems with this approach: the carbon markets have led to corruption, human rights violations, failure of regulation and a broad range of unintended negative social and environmental impacts. Meanwhile, emissions have increased. We believe that biodiversity markets will fail to stem biodiversity loss and will be a major distraction from the real priorities.

Innovative Financial Mechanisms is a broad term that covers many items. In this submission to the CBD we focus on *offset programmes*. It is critical that any discussions about biodiversity offsets in the international arena take into consideration the serious, empirically demonstrated flaws in existing offset markets for both carbon and biodiversity.

As members of civil society organisations who have observed and participated in both the discussion in the UNFCCC and the CBD, we are concerned about the move towards offset programmes as so-called Innovative Financial Mechanisms (IFMs).

We base our concerns on the experiences with Carbon Offsets, especially with the EU's Emissions Trading Scheme (ETS), the US Wetland Banking, the Business and Biodiversity Offsets Programme (BBOP) and discussions at national level.

We have seen fraud in carbon trading, lack of sufficient monitoring, compensation for damages instead of avoidance and mitigation, and the understanding that it is acceptable to destroy biodiversity in a given location if biodiversity is protected or

'improved' somewhere else.

We raise general concerns about zoning biodiversity into areas of high and low value, especially its lack of scientific basis, about fragmentation versus integrity especially with respect to concepts like 'forest mosaics' that will further increase the damaging effects of fragmentation, and about the difference of 'price' and 'value' that will need to be applied to biodiversity. We already see the practical problems of carbon offsets where only one 'commodity' is traded, while biodiversity offsets will require assessments of the biodiversity that will be destroyed, the location of the offset measures and the offset measures themselves. We wonder about the practical implications when locations and catchment areas stretch across political borders.

Last but not least we see the real danger that biodiversity offsets can lead to human rights violations not only once but twice over, when Indigenous Peoples and Local Community rights are violated both at the location of the initial project as well as at the location of the offset measure.

It should be highlighted that these concerns are not voiced by civil society only.

On 14 July 2011, on the final day of the Second meeting of the *Transitional Committee* (TC) in Tokyo, a group of 13 developing countries formally tabled a document on the operational elements for the establishment of the *Green Climate Fund* (GCF) under the United Nations Framework Convention on Climate Change (UNFCCC; TWN 2011).

The document notes:

> “The private sector in developed countries is encouraged to make supplementary contributions and donations to the Fund. However, resources of the Fund should not be used for subsidizing corporations or financial institutions of developed countries (as the Fund is established to provide resources to developing countries). Such contributions shall not include payments by companies for offsetting in the carbon trade, as financial resources provided by carbon markets are to enable developed countries to implement their mitigation commitments and are not contributions towards the financing commitment of the developed countries in accordance with the Convention.”

We believe that these comments help to show why biodiversity offsets - instead of helping to protect biodiversity - enable companies to continue destroying biodiversity outside so-called 'hotspots'. This is not a sustainable way to protect biodiversity.

2 Experiences

2.1 Carbon Offsets

Carbon offsets were originally developed in the US and set out in its 1990s *Clean Air Act*, as part of its *Acid Rain Programme*. In the development of this offset system "industry successfully lobbied local government to replace existing and proposed air

quality regulations with a **trading programme**" (Lohmann 2006). The US were a key actor in installing offsets in the Kyoto Protocol - even though the US later did not ratify it.[1]

Carbon offsets attempt to reduce climate issues to linear measurements of CO2 equivalents (CO2e). Thus one source of CO2e can be set against another, regardless of the processes involved. This concept of equivalence is already questionable for CO2, but even more so for biodiversity. Ecosystem functions and biodiversity are complex and therefore extremely difficult or impossible to reduce to tradable commodities.

How would decisions be reliably made about whether one area is genuinely equivalent to another in order to decide whether or not there is *"no net loss"*? Yet this is crucial for offsetting to achieve that aim of *"no net loss"*.

2.1.1 Emissions Trading Scheme

The European Union Emissions Trading Scheme (EU ETS) was launched in 2005 and is the largest multi-national emissions trading scheme in the world. However already 4 years later, the failure of carbon markets to limit carbon emissions has been admitted in the EU:

> "The EU's emissions trading scheme has so far failed to deliver any reductions in CO2 emissions while at the same time strangling energy-efficiency investment in the electricity sector, according to a former European Commission official" (Euractiv, 22 April 2009).

We are afraid that biodiversity offsets could in a similar way mask continued biodiversity loss. Susan Walker (Biodiversity and Conservation team, Landcare Research, New Zealand) notes in a scientific article:

> "Their proliferation without credible solutions suggests biodiversity offset programs are successful 'symbolic policies,' potentially obscuring biodiversity loss and dissipating impetus for action." (Walker et al. 2009).

2.1.2 Carbon Credit Fraud

Not only has the ETS failed to deliver CO2 reductions, it has also become the victim of Carbon Credit frauds, as Europol, the EU law enforcement agency had to state in a press release in 2009:

> "The EU Emission Trading System (ETS) has been the victim of fraudulent traders in the past 18 months. This resulted in losses of approximately 5 billion Euros for several national tax revenues. It is estimated that in some countries, up to 90% of the whole market volume was caused by fraudulent activities."[2]

Seven men are currently charged in the UK with conspiracy to cheat the public revenue

1 Further details on this issues see our publication "Carbon - The New Cash Crop? Paul (2010)

2 The original press release is not online available any more. A follow-up was published by Europol in 2010.

and conspiracy to transfer criminal property over their £38m carbon trading VAT fraud in 2009 (Inman & Webb 2009). Another three men are charged in Belgium for allegedly siphoning 3 million Euro from the carbon trading market.

In January 2011, spot carbon trades were halted in the EU, after the theft of 30 million Euros of carbon allowances from customers' accounts by computer hackers were discovered in Eastern Europe. Subsequently emission trading exchanges remained closed in and beyond February 2011, since the exchanges failed to improve their IT security. The European Commission, which runs the EU's trading scheme, had closed trading until exchanges would meet minimum software security standards.

A statement by the EC to this effect, led to a plunge of carbon prices within half an hour (Macalister 2011).

2.1.3 Lessons for a biodiversity offset market

As we have seen above, Carbon Credits have now become a tradable commodity, on which traders can make large-scale gains and losses, and they are vulnerable to fraud. The same will be true for a biodiversity offsets market.

Furthermore, the big money is not in the carbon credits themselves, but in the carbon credit derivatives markets. It would be extremely dangerous to allow a derivatives market to develop on top of a biodiversity offsets market, since this would simply add to the instability and lack of accountability in such a market, as well as further reduce the connection between offsets and positive impacts on biodiversity. However, it is questionable whether the development of such a derivatives market could be prevented if biodiversity offsets were to become established.

While the argument might be that biodiversity offsets - in contrast to carbon credits - would be dealing with physical objects like plants and animals, this is only partly true since biodiversity and ecosystems are more than just the list of species and size of populations. The interactions within ecosystems are fundamental to the dynamics and resilience of the whole and this is not adequately addressed under the term *ecosystem services* which is increasingly used instead of the broader term *ecosystem functions.*

2.2 Wetland Banking

US Wetland Banking[3] deals with offsets for damage or destruction of wetland sites in the USA. It is the longest standing ecosystem/biodiversity offsets system in the world.

> According to its Market Features & Rules (Ecosystem Marketplace), "when a land developer fills or otherwise impacts a wetland they may buy offsets from a mitigation banker. The mitigation banker restores, enhances, creates or preserves an area of wetland to generate credits."

Some key problems with wetland banking have been identified in the following areas:

1. **Ecological monitoring:** There has been no serious, systematic assessment of wetland banking in the USA. In other words, there is very little evidence to show

3 Information about the US Wetland Banking is available at the *Ecosystem Marketplace* website.

whether the approach really works to conserve wetlands (Robertson & Hayden 2008).

There is growing evidence, that wetland banking does not have the desired ecological effects:

- The majority of projects (67%) that restored or created wetlands independently (i.e. not through a mitigation bank) were not successful at meeting permit requirements in terms of wetland area (Kettlewell et al. 2008, see also Mack & Miacchion 2006).
- In Ohio, scientists looked at the twelve oldest of the state's 25 wetland mitigation banks. Although these had been studied and monitored by the Army Corps and the Environmental Protection Agency (EPA), the study found that many were not up to standard when checked against stringent scientific criteria. Indeed, against these measures only three banks scored in the "successful category" while five passed in some areas and failed in others. The remaining four failed nearly every assessment, functioning more like shallow dead pools than wetlands. Even more disturbing was that none of the government agencies charged with oversight were taking the bank managers to task for this (Worldwatch 2008: 129).

2. **Compensation instead of avoidance and mitigation:** There is evidence that the Wetland Banking in the US focuses predominantly on compensation rather than other aspects of the mitigation hierarchy such as avoidance and minimization (mitigation) (Hough & Robertson 2009). This is a serious pragmatic problem with offsets: they often do not encourage reducing or avoiding impacts, but rather move immediately to compensation. This finding is also confirmed in other jurisdictions, for example in Canada (Clare et al. 2011).

   If due attention is not paid to every stage of the mitigation hierarchy, offsets can easily act as a kind of *perverse incentive* to development.

3. **Offset location and equivalence:** Choosing an offset site is a critical decision. Experience from the US show that in this programme questionable locations were chosen outside the impacted watershed: locations that did not meet the *'like for like'* criteria (Kettlewell et al. 2008).

2.3 Business and Biodiversity Offsets Programme

The Business and Biodiversity Offsets Programme (BBOP) is a collaboration of some 50 companies, financial institutions, governments and civil society organisations, who are members of its Advisory Group. It is involved in piloting biodiversityoffset projects and has developed principles for them.

At the *Global Business of Biodiversity Symposium* in July 2010, Kerry ten Kate of BBOP noted that what companies want are access to resources, a license to operate, access to capital, markets and a seat at the policy development level, and that therefore agreeing to protect biodiversity in exchange for access to land and resources is in the

interest of business. This echoed remarks made by the company Rio Tinto earlier.

> **Example: Ambatovy project**
>
> The Ambatovy project in Madagascar is used by BBOP as a pilot case study and was described by Ten Kate as a successful example. Composite offsets are proposed to protect Anhera forest to offset damage to similar forest around a Rio Tinto's proposed nickel mine.

In the *Business and Biodiversity Offsets Programme*, the aim is to enable companies to do business - and thereby destroy biodiversity - in area A in exchange for restoring or protecting area B.

However, ecosystems work as wholes and their resilience may well depend on their integrity being maintained. Different areas of biodiversity are not necessarily equivalent.

3 General concerns

3.1 Replacing existing legislation?

Just as with carbon offsets, any biodiversity offset system has the potential to replace, dissipate and/or counteract planning regulations and legal requirements on international, national and regional levels. Existing legislation concerning environmental impact assessments would also need to be incorporated.

3.2 Zoning into high and low value areas?

Biodiversity offsets could easily lead to zoning biodiversity into high and low value areas and trading commitments to the protection of “high value biodiversity areas” for access to resources such as mining on areas designated as being of lower value. In addition, the company can earn reputation and cash from having its name attached to the high biodiversity areas.

However, there is little scientific basis for high biodiversity and low biodiversity area classification schemes, let alone an agreed methodology for such classification. Considering the significant economic interests at stake, this entails an important risk of unfounded classifications.

3.3 Forest mosaics

Conservative International describes their *Forest mosaics* project as giving forest companies the opportunity to "reduce deforestation in the Brazilian rainforest, improve local livelihoods and protect biodiversity - all while making a profit".

Like a patchwork quilt, it proposes to set up a mosaic of planned "locations and intersections of natural reserves, protected areas, plantations, agricultural land, infrastructure and settlements", leaving it to "landowners and other stakeholders" to determine which areas are most suitable for agriculture and forestry, which areas

should be protected to "conserve water, store carbon and provide other ecosystem benefits" and which habitats are crucial for the survival of species. As Conservation International points out: in this case the landowners who should play a crucial role in this would be paper and pulp companies who are among the largest landowners in the Brazilian Amazon.

The main problem with the mosaic concept is that it seems to ignore the significant impact fragmentation has on forest biodiversity and other ecosystems. For many species, fragmentation is one of the main causes of their decline. Top predators especially, which play a crucial role in the food chain, tend to be unable to survive in a fragmented ecosystem. The decline of these species will have impact on the entire ecosystem.“ (See also section 3.5 on fragmentation.)

Another significant problem with the mosaic concept is that it assumes a highly participatory and equitable physical planning process to determine the different land uses in a certain area. This assumption is detached from the realities in most countries, where local and national elites and economically powerful actors like corporations will be able to manipulate land planning processes to their advantage, thus marginalizing less influential actors and groups like Indigenous Peoples, small farmers and women. Experiences with forest carbon offset schemes have demonstrated how the latter risk losing their lands and livelihoods when the forests and lands they depend on suddenly increase in economic value.

Institutions like the FAO have pointed out the risks of sudden increases in value of land for people who do not yet have secure rights to those lands.

Although industry presents the mosaics concept to show that exploitation/production and conservation can go together, it is not clear whether this is really possible. Fragmentation of ecosystems is likely to degrade them and to reduce biodiversity. It may have crucial impacts on total biodiversity for example by altering the food chain through the removal of top predators or other adverse effects. Local communities - especially indigenous people - are unlikely to benefit. Altogether this proposed *Forest mosaic* appears more like a desk exercise of mapping than a response to the realities on the ground.

3.4 Catchments, locations and political borders

How is the catchment area of an ecological region determined, and what areas are taken into account for the location of offsets? Ecosystems are not necessarily bound to national or other political borders.

If the effect of biodiversity destruction takes place across a border, will the offsets be located on both sides the border, effectively cutting the area in two smaller areas? Or will offsets only be located on one side of the border? Would this lead to countries being able to sell off their responsibilities to protect biodiversity to other countries?

3.5 Fragmentation versus Integration

Offsetting the destruction of one part of an ecosystem in a different location leads to

fragmentation of ecosystems. Such fragmentation by market forces stands against the need to protect ecosystem integrity and integrated approaches.

In intact forest landscapes for example, even the building of a road leads to fragmentation, with increases in the relative length of forest edges and an increase of edge effects. Among other effects, trees on the edges of such fragments are vulnerable to drought, wind and fire (Laurance 2005).

> "Edge effects in fragmented forests have now been well documented (e.g. Gascon et al. 2000) and include: increased tree mortality, especially amongst large mature trees of high biodiversity value (Laurance et al. 2000a); impairment of seed germination (Bruna 1999), shift to pioneer tree species; increased vines, which block out light preventing forest regeneration (Laurance et al. 2001b) and negative responses of butterflies, ants, beetles and termites (Laurance et al. 2000b). Edge effects have serious ecological consequences, which may threaten the survival of the remaining forest fragment (Gascon et al. 2000)." (Cotter 2003).

Fragmentation therefore not only affects the area on which biodiversity is directly damaged or destroyed, but also surrounding areas. Can biodiversity offsets account for this? When do intact areas become too small to function?

Fragmented ecosystems including forestry and forest mosaics, and protected areas of high biodiversity may not be consistent with protecting ecosystem functions and biodiversity. In this context we all too often do not actually understand how to protect biodiversity because we do not understand the relationships between species in the affected areas. So-called high biodiversity regions risk being isolated or enclosed and set against or traded for development of low biodiversity/carbon regions (zoning).

In order to retain their resilience, ecosystem integrity must be retained, but a market approach may not be coherent with this need.

3.6 The difference between price and value

At the aforementioned *Global Business of Biodiversity Symposium*, Pavan Sukhdev, TEEB study leader, talked about the difference between *price* and *value.* He stated that nature is largely economically invisible and that it is the aim of TEEB to make its economic services more visible. However, *price* is not the same as *value.* The aim of the TEEB is to give a *shadow price* to biodiversity.

Such an approach is - in spite of good intentions - at best confusing. TEEB is very clear that all the values of nature - its health, psychological, spiritual, and asthetic values - are beyond price, yet TEEB speaks of a shadow price that may include all these values.

> **Example: Mangrove forest versus shrimp farming**
>
> Pavan Sukhdev described an example of a short-term economic return - a shrimp farm - versus a long term value that it replaces - the mangroves.
>
> In this example, cutting down the mangroves results in a timber sale of USD

600, and shrimp sales in USD 9,600. Subsidies for shrimp farming amount to USD 1,200. However after 4-5 years, shrimp farming becomes unviable and restoration will have to be carried out.

In contrast, mangroves provide long-term fish nurseries and storm protection for the coast, so the long-term value of the magroves is higher than the return for shrimp farming.

One point that Sukhdev stated himself while giving this example is that these economics do not recognize communities.

According to Sukhdev, the value of nature is infinite; and that expressing value is much more complex than simply putting a price on nature, which he says he is often asked to do. However this - putting a price on nature - is exactly what biodiversity offsets would have to do if they are to function in the market.

It is not clear how nature can be valued without naming a price, especially with regard to creating markets. In addition, a widely acknowledged problem with markets is that they generally take a short-term approach to extracting profits, whereas the health of biodiversity has to be seen in a long-term context.

TEEB itself is not able to suggest ways to prevent short-term exploitation by citing long-term values.

Another example of the difference between price and value comes from Russia in 2010, showing how absurdly wrong things can go, when financial estimates are required.

Example: Pavlovsk seed bank

In 2010, the Russian state sold the land on which the *Pavlovsk Research Station*, part of the *N.I. Vavilov Research Institute of Plant Industry* is located, to a private developer who wants to build houses there. The research station is a seed bank for fruit trees and berries, including almost a thousand types of strawberries and black currants from 40 and 30 countries respectively, 600 varieties of apples from 35 countries, and more than a hundred varieties each of gooseberries, cherries, plums, red currants, and raspberries. In contrast to other seed banks, seeds are not stored as frozen seeds, but are grown on an area of about 500 hectares. An estimated 90% of the varieties are not available in other seed collections. (Vidal 2010, Pearce 2010, Jégo 2010).

"In what appears Kafkaesque logic, the property developers argue that because the station contains a 'priceless collection', no monetary value can be assigned to it and so it is worthless. In another nod to Kafka, the government's federal fund of residential real estate development has argued that the collection was never registered and thus does not officially exist." (Vidal 2010)

After an international campaig,n the auctions to sell the land to private owners have been halted for the time being, but its future is still unclear.

3.7 The desire for simplicity versus actual complexities

The need for simplicity and speed (e.g. to get an economic project approved) versus the complexities of the assessments are already a well-known problem in the carbon market, where the complexities of the so-called MRV (measurement, reporting and verification) are continuously discussed.

For biodiversity offsets the complexities of assessment are much greater since the biodiversity to be destroyed as well as the proposed offset location and proposed measures need to be assessed - and these assessments need to go beyond a list of the species present to somehow include its intrinsic values.

The tensions that already exist in the carbon market between the demands of the market approach for simplicity and speed and the need for clear baselines and independent assessment of claimed benefits will be much greater for biodiversity offsets. Promoters of the carbon market currently seek generalisations and general assumptions about benefits in order to enable the process to move forward. Generalisations, however, will be impossible for biodiversity offsets, where every ecosystem, its location, species web, health, psychological, spiritual, and aesthetic values, is unique - as are the locations that are to be used as offsets.

As Walker et al. (2009) note:

> "Viable trading requires simple, measurable, and interchangeable commodities, but the currencies, restrictions, and oversight needed to protect complex, difficult-to-measure, and non-interchangeable resources like biodiversity are costly and intractable. These safeguards compromise trading viability and benefit neither traders nor regulatory officials." [...] "We posit that weak technical design and lax enforcement are predictable features of regulatory biodiversity trading, and that sound and well-intentioned ecological advice is unlikely to correct this."

3.8 Offsets on marginal lands

Besides an appropriate assessment of the biodiversity to be destroyed, a second assessment is required for the location at which the offset measures are meant to take place. The last years have seen a growing trend to describe land as 'marginal': un-used, under-utilized, idle, not used for agriculture or commercial purposes, and therefore available for other, more profitable, purposes. Even though the term "marginal" is not well defined, it can describe areas which are not biodiversity hotspots or which are not biodiverse in themselves, but which are also important for biodiversity and ecosystem resilience. Some local community uses might increase biodiversity without being visible to Western eyes.

The assumption that large quantities of 'marginal' land exists and can be used to solve the problems of climate change has been criticised before (African Biodiversity Network et al. 2008). Proposing to 'improve' the biodiversity of such lands will cause the same problems and can lead to human rights violations (see below).

4 Human Rights violations

Already, problems occur when the establishment of a protected area conflicts with the local and indigenous communities living there. The CBD has previously acknowledged these problems, but has been unable to solve them. At the same time human rights violations occur where land is taken over for different purposes (such as mining, large-scale agriculture, industrial development, road building etc.) and where no formal land titles exist or established rights are violated. Biodiversity offsets could even harm local and indigenous communities twice over: once at the site where development is planned, but also the biodiversity offset results in a protected area that exclude them from accessing resources on which their livelihoods depend.

Human rights violations are very likely to occur when forest and other land that was previously of little value but used by economically marginalized groups like landless peasants, women and Indigenous Peoples suddenly becomes attractive for economically valuable purposes (such as mining, large-scale agriculture, industrial development, road building etc). In addition, land can become the focus of attention when it is considered 'marginal' (unused, underutilized etc.) and therefore available as an offset-location.

Often these areas are in fact used, often by parts of society that are marginalized themselves. Areas might also hold spiritual or religious value and are therefore (for example) not used for agriculture (African Biodiversity Network et al. 2008).

A number of countries do not yet have clear land tenure rights, or otherwise the granting of such tenure is biased against those using the land for their own survival. The issue of formal tenure and titles to land have already been identified by the FAO (2009) as a factor in dealing with the food crisis.

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ORIGINAL PAPER

Where is the avoidance in the implementation of wetland law and policy?

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Abstract Many jurisdictions in North America use a "mitigation sequence" to protect wetlands: First, avoid impacts; second, minimize unavoidable impacts; and third, compensate for irreducible impacts through the use of wetland restoration, enhancement, creation, or protection. Despite the continued reliance on this sequence in wetland decision-making, there is broad agreement among scholars, scientists, policy-makers, regulators, and the regulated community that the first and most important step in the mitigation sequence, avoidance, is ignored more often than it is implemented. This paper draws on literature published between 1989 and 2010, as well as 33 semi-structured, key-informant interviews carried out in 2009 and 2010 with actors intimately involved with wetland policy in Alberta, Canada, to address key reasons why "avoidance" as a policy directive is seldom effective. Five key factors emerged from the literature, and were supported by interview data, as being central to the failure of decision-makers to prioritize wetland avoidance and minimization above compensation in the mitigation sequence: (1) a lack of agreement on what constitutes avoidance; (2) current approaches to land-use planning do not identify high-priority wetlands in advance of development; (3) wetlands are economically undervalued; (4) there is a "techno-arrogance" associated with wetland creation and restoration that results in increased wetland loss, and; (5) compensation requirements are inadequately enforced. Largely untested but proactive ways to re-institute avoidance as a workable option in wetland management include: watershed-based planning; comprehensive economic and social valuation of wetlands; and long-term citizen-based monitoring schemes.

Keywords Wetland · Policy · Avoidance · Mitigation · Compensation · Management · Loss · Watershed planning

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Introduction

Many jurisdictions in North America use a "mitigation sequence" to protect wetlands: First, avoid impacts; second, minimize unavoidable impacts; and third, compensate for irreducible impacts through the use of wetland restoration, enhancement, creation, or

protection. Despite the continued reliance on this sequence in wetland decision making, there is broad agreement among scholars, scientists, policymakers, regulators, and the regulated community that the first and most important step in the mitigation sequence, avoidance, is ignored more often than it is implemented (Burgin 2010; ELI 2009; Hough and Robertson 2009; Murphy et al. 2009a). While many studies have shown that compensatory laws and policies have not been effective in maintaining wetland area and function (for example, Spieles 2005; Cole and Shafer 2002; NRC 2001; Malakoff 1998; Roberts 1993; Zedler 1996), and often have unintended social impacts (see BenDor et al. 2008; BenDor et al. 2007; Ruhl and Salzman 2006), few explicate *why* these laws and policies have failed, or suggest alternative approaches to regulating and managing wetland impacts.

Toward that end, the key objective of this paper is to summarize research explaining why wetland avoidance is commonly overlooked in the permitting process, and to advance what we consider to be key policy modifications or alternatives to incentivize wetland avoidance as a workable alternative to compensation. By critically examining factors that influence wetland permitting decisions, improvements can be made to wetland law, regulation, and policy such that losses can be prevented, rather than following the heretofore pattern of permitting losses and hoping that compensation will replace lost wetland area, values, and functions.

While there are many countries worldwide that have made strides in wetland regulation, we have limited our examination of wetland law, regulation, and policy to the United States and Canada, and specifically the province of Alberta. As carried out in other environmental policy and conservation strategy evaluation studies (e.g., Reed 2008; Lovell and Sullivan 2006; Brooks et al. 2005), we conducted a web-based search of wetland management literature from peer-reviewed sources and widely available grey literature published between 1989 and 2010. Articles were located using search engines such as ISI Web of Knowledge, JSTOR, Web of Science, and Google Scholar, using keyword search terms such as: wetland, plan, success, assessment, avoidance, compensation. This work was also informed by 33 semi-structured, key-informant interviews conducted in Alberta between 2009 and 2010. Key informants were asked questions about the effectiveness of the existing wetland policy and the sample consisted of regulators, agency decision-makers, scientists, industry representatives, and consultants who were intimately familiar with the policy. This sociological methodological approach has been applied previously in the evaluation of wetland policy implementation in Louisiana (Krogman 1999). Interviews were conducted until saturation was reached, i.e., no new arguments were advanced among respondents (Krogman 1996), and all interviews were recorded, transcribed, and coded across themes using the qualitative data analysis software program NVIVO.

Background: wetland regulatory context

United States

Wetland regulation has a long and complex history in the United States, going back to 1972 and the introduction of Section 404 of the Federal Water Pollution Control Act (more commonly known as the Clean Water Act). The principal intent of the Act was to "restore and maintain the biological, chemical, and physical integrity of the Nation's waters" in part through the establishment of the Section 404 permitting program. This regulatory process requires that an Individual Permit be issued for any activity that results in the discharge of dredged or fill materials into waters of the United States, including wetlands (Hough and Robertson 2009; Chertok and Sinding 2005; Williams and Connolly 2005). Both the Army Corps of Engineers (the Corps) and the Environmental Protection Agency (EPA) were given jurisdiction over the permit program, with the Corps being responsible for overseeing day-to-day permitting activities, and the EPA being given authority ("in conjunction with" the Corps) to develop guidelines for permit approvals, as well as the authority to override any permit approval issued by the Corps (Ellis 2005).

In 1977, amendments were made to the Clean Water Act that allowed the Corps to issue General Permits for activities that resulted in "only minimal adverse environmental harm".[1] These General Permits lacked the more rigorous environmental oversight

[1] 33 U.S.C. Section. 1344 (e)(1) (2000).

of Individual Permits (Hough and Robertson 2009; Taylor and Geoffroy 2005), and clearly signaled that the goal of restoring and maintaining the integrity of wetlands was not going to be achieved by simply denying permits and avoiding impacts. Consequently, other regulatory and policy mechanisms began to emerge, and the concept of "mitigating" the damage to wetlands through impact minimization or compensation began to gain traction as an alternative to wetland avoidance (Hough and Robertson 2009; Kruczynski 1990).

In 1980, the Section 404(b)(1) Guidelines were released, putting new restrictions on the discharge of dredged and fill materials and formalizing the concept of "sequencing" wetland permit decision-making. Under Section 230.10 (a–d) of the Guidelines, a permittee must demonstrate that there is no other available, feasible, or environmentally preferable alternative to the proposed project: the so-called least environmentally damaging practicable alternative (LEDPA) analysis (Pifher 2005). While these regulations formally prioritize wetland avoidance over impact minimization and compensation, permittees can argue that there are no other "practicable alternatives" to the proposed project by citing limitations presented by factors such as land ownership and availability, geographic scope, economic viability, logistics, and/or technological feasibility (Pifher 2005). Further, permittees can define their overall project purpose in a way that effectively makes alternatives to wetland loss impracticable; they can also argue that their project is "water dependent", or that alternative sites would result in less desirable environmental outcomes (Hough and Robertsen 2009; Pifher 2005). The Corps and the EPA have also acknowledged that there is a need for "flexibility" in the application of the alternatives analysis, given that impacts to wetlands may vary in their extent, severity, and duration (Pifher 2005). Combined, these factors have led to a general failure by both the Corps and EPA to strictly enforce the mitigation sequence as written in the 404(b)(1) Guidelines, and have arguably contributed to the creation of a regulatory culture where "mitigation" and "compensation" are generally seen as being one and the same (Hough and Robertson 2009).

The reliance on compensation over avoidance as a mechanism for achieving wetland management goals was reinforced in 1989, with the adoption of the "no net loss" policy by the Bush administration. While many felt that this new policy elevated the issue of wetland loss in the national consciousness, there was also a recognition that the no net loss goal "was not merely to be achieved through the denial of permits, or even the avoidance and minimization of impacts, but rather through allowing impacts and requiring compensation" (Hough and Robertson 2009, p. 26). As the use of wetland compensation grew throughout the 1990s, there was mounting pressure from industry to move away from on-site and in-kind wetland mitigation, and towards the use of wetland mitigation banking as a market mechanism that would allow for the increasing use of off-site compensation (Ruhl et al. 2009; Salzman and Ruhl 2005). This approach to wetland compensation was seen by government agencies to "ensure wetlands conservation at minimum economic and political cost" (Salzman and Ruhl 2005, p. 2), and by 2005 wetland banking had grown to account for as much as 30% of all mitigation being carried out in the US (Wilkinson and Thompson 2006). The increasing use of wetland banking as a form of permittee-responsible mitigation drove the need for clearer and more consistent standards and procedures. As a result, the Corps and the EPA jointly issued new rules for wetland mitigation in April of 2008. Though designed to improve compensation outcomes by creating clear performance standards and administrative procedures, concerns have emerged that the procedures outlined in the new rule will become yet another regulatory mechanism that further institutionalizes the use of compensation over avoidance (Stokstad 2008). Given that less than one percent of permits in the US are denied by the Corps (Murphy et al. 2009b), and the general assumption by proponents that they will not be denied a permit (Nichols 2008), it seems apparent that compensation, over avoidance or minimization, has become the preferred mechanism by which to achieve the goal of no net loss in the United States (Hough and Robertson 2009; Race and Fonseca 1996; Kruczynski 1990).

Alberta, Canada

Wetland management and regulation in Canada has a much shorter history than that of the United States, and wetland policy in many Canadian jurisdictions is either non-existent or is in early stages of

development (Rubec and Hanson 2008). One exception to this is Alberta, where the trajectory of wetland policy can be said to resemble that of the United States, particularly with respect the growing trend towards the use of compensation over avoidance as a mechanism to meet wetlands policy goals.

In 1993, Alberta introduced a regional wetland policy that primarily applied to marsh wetlands in the settled areas of the province. While the stated policy goal is to "sustain the social, economic, and environmental benefits that functioning wetlands provide, now and in the future" (AWRC 1993), the implementation of the policy has focused on achieving a no net loss of wetland area through conserving wetlands in a natural state, mitigating the degradation or loss as close to the site as possible, and enhancing, restoring, or creating wetlands in areas where they have been depleted or degraded (Rubec and Hanson 2008; AWRC 1993). While Alberta was one of the first provinces in Canada to adopt a wetland policy, very little progress was made with respect to implementation of the policy until December of 1999, when the outdated Water Resources Act was replaced by the Water Act. This new legislation shifted the focus away from solely regulating the allocation of water, and instead included a more comprehensive purpose for supporting and promoting the "conservation and management of water, including the wise allocation and use of water".[2] Under the Act, any activity that "causes, may cause or may become capable of causing an effect on the aquatic environment"[3] requires an approval, and in making a decision about granting an approval, the government "may consider any existing, potential or cumulative effects on the aquatic environment".[4] Notwithstanding this more conservation-oriented language, the Purpose of the Act also specifies that decisions about the management of water resources must also recognize "the need for Alberta's economic growth and prosperity".[5]

As in the United States, the mitigation sequence has been used to help inform and direct wetland decision-making in Alberta, and outcomes have been similar with respect to a pervasive tendency to skip over any serious consideration of wetland avoidance, and to instead move immediately to compensation for wetland loss. One of the most significant differences between these jurisdictions in their approach to wetland regulation, however, is that Alberta has no equivalent process to the alternatives analysis, and no formal process for defining the basic project purpose. Once a proponent enters the permitting process, there is often very little consideration given to whether there are alternatives to the proposed project location, as expressed by one government approval writer who said:

> What we found is that avoidance just doesn't seem to be an option for most of [the permit applicants] out there. They've already planned their project; they know what they want to do. It's very difficult to work around that. (Approval writer, personal communication, June 2009)

In fact, many policy actors in Alberta feel that wetland avoidance is simply not a practical option in light of other considerations, such as economics. There is often an acceptance that there is no alternative to filling the wetland and simply compensating for the loss, as summarized by another government approval writer who said:

> We would want you to avoid the impact whenever and wherever possible, but there is a realization that it's not practical and development will occur, and so then we have to go to minimize, mitigate, and compensate. (Approval writer, personal communication, August 2009)

The general failure to avoid wetland impacts in both the US and in Alberta, despite this preference being stated in regulation and policy, has led to an overall decline in the number and quality of natural wetlands in many jurisdictions across North America (Dahl and Watmough 2007; Walters and Shrubsole 2005; Zedler and Kercher 2005). It has also spurred a lively debate over whether the mitigation sequence of avoid, minimize, and compensate is an effective approach for managing wetland habitats within a no net loss framework. For example, Burgin (2010) suggests that "the outcome for wetland mitigation may not be an 'unmitigated disaster' but it is, at best, modestly successful" (p. 53), and Murphy et al. (2009b) go so far as to say that "mitigation activities

[2] Water Act, R.S.A. 2000, c. W-3, §2.

[3] Water Act, R.S.A. 2000, c. W-3, §1(1)(b)(i)(D).

[4] Water Act, R.S.A. 2000, c. W-3, §38(2)(b)(i).

[5] Water Act, R.S.A. 2000, c. W-3, §2(b).

continue what can only be described as a 'cockeyed optimist' approach to aquatic resources permitting—one that is destined to lead to further deterioration of the nation's aquatic resource base" (p. 3112). Given that many jurisdictions have adopted the mitigation sequence as a means to achieve a no net loss of wetlands, it is critical that we begin to better understand the key factors that lead to the pervasive tendency to skip-over avoidance.

Key failures in the avoidance of wetlands

Five key factors emerged from the literature, and were supported by interview data, as being central to the failure of decision-makers to prioritize wetland avoidance and minimization above compensation in the mitigation sequence:

1) A lack of agreement on what constitutes "avoidance";
2) Current approaches to land use planning do not identify and prioritize wetlands in advance of development;
3) Wetlands are economically undervalued;
4) A "techno-arrogance" is associated with wetland creation and restoration, resulting in increased wetland loss;
5) Requirements for compensation are inadequately enforced.

A lack of agreement on what constitutes "avoidance"

Foremost on the list of problems associated with the wetland mitigation sequence is the absence of a clear understanding on what constitutes "avoidance", and a lack of standardized methods or guidelines for evaluating or interpreting this regulatory requirement (ELI 2009; Yocom et al. 1989). While the regulatory understanding around wetland mitigation in the US has historically included a sequencing of "avoid, minimize, and compensate", these words were never expressly written into US regulation until the Final Rule on Compensatory Mitigation for Losses of Aquatic Resources was issued in April of 2008. Prior to that, the concept of wetland mitigation was only vaguely defined as a sequence of decisions that make up the alternatives analysis, which was further clarified in a Memorandum of Agreement between the Corps and the EPA in 1990. A critical component of the alternatives analysis is how the proponent has defined the basic project purpose, and whether the regulator accepts the project purpose as presented. While the regulator is not obligated to accept the basic project purpose as proposed by the permittee, this step alone has the potential to foreclose on any opportunity to avoid wetland impacts; if the purpose has been too narrowly defined, alternatives may be considered impracticable (Pifher 2005). The language that allows compensation if avoidance or minimization "is not practicable" becomes a de facto loophole in its non-specificity, allowing developers to skirt the intent of the law and move directly to compensation. Given that there is no rigorous and repeatable process under which to consider "practicability" (Murphy et al. 2009a), the availability of options other than avoidance, such as compensation, are too easily considered by regulators. For example, in the US, Krogman (1999) found that administrative momentum, or the implicit assumption that regulators need to find a way to make it *work for the applicant*, makes asking the permit applicant to consider other sites for development seemingly unreasonable.

Once there is agreement on the basic project purpose and the proponent has demonstrated there is no other practicable alternative in terms of project location, there is still a requirement under Section 230.10 of the 404(b)(1) Guidelines to make the on-site impacts to the wetland as small and innocuous as possible, including giving consideration to how the project can be designed to avoid or minimize impacts (Hough and Robertson 2009). In this step there is additional confusion over the meaning of avoidance; to some regulators on-site avoidance means preventing direct impacts, such as placing fill material directly into a wetland. To other regulators, "an attempt constitutes avoidance" (ELI 2009, p. 3), meaning that any effort to modify a project—regardless of whether the project ultimately results in a direct impact—is considered avoidance. The language around the "minimization" of wetland impacts is also sufficiently vague, and in many cases, avoidance and minimization are lumped together such that "any measures to reduce impacts usually are applied to satisfy both requirements" (ELI 2009, p. 6).

Given that Alberta does not have a formal process to examine alternatives to the project location, most

of the consideration for avoidance and minimization is given to project design, and many regulators have indicated that they lack clear guidance on when to deny permits on the grounds that the applicant has not demonstrated wetland avoidance on-site. This was expressed by one wetland approval writer who commented:

> [The mitigation sequence] is more of a mechanism for enabling [wetlands] to be disturbed. We don't really have a good mechanism of saying, 'When should we say no?' If you have a sensitive vegetation species, should we be saying no? If there's sensitive wildlife, should it be no? We don't have clear guidelines on that. (Approval writer, personal communication, August 2009)

Given the lack of clarity around what constitutes avoidance and minimization, in addition to an absence of clear standards or guidelines, wetland permit decisions in both the US and Alberta are subject to a high degree of subjective interpretation by regulators. This leads to an approval process that is characterized by inconsistent decision-making and uncertainty within and between jurisdictions (ELI 2009). In Alberta, one regulator is quoted as saying:

> Consistency is an issue…and personally, I think it looks bad in the department. We should [have] a standard approach. Maybe you have different flavors from different offices, but the requirement…and the expectations should be the same across the board (Approval writer, personal communication, August 2009)

Some government agencies also consider their role to be about managing for development, rather than conserving or protecting wetland resources (Krogman 1996, 1999). For example, one regulator from the United States was quoted as saying, "Let's be real, this is not a prevention program, it is a regulatory program" (ELI 2009, p. 3). Such attitudes lead to more permissive application processes where regulators rarely deny approvals (Hough and Robertson 2009; Murphy et al. 2009b), but rather work together with applicants to achieve the applicant's desired outcome. For instance, one wetland approval writer in Alberta said:

> Well, there's always the ability to say no. Do we say no very often? Not really. What we try to achieve is the best outcome. (Approval writer, personal communication, June 2009)

In most cases, the "best outcome" does not include the avoidance of wetland impacts, but rather, approval of development plans and permit conditions that are palatable and acceptable to the applicant, which most often includes wetland compensation (Nichols 2008).

Poor planning in advance of development

Failure to identify, recognize, and specifically designate wetlands or wetland communities that should be prioritized for conservation, protection, or restoration enables continued incremental losses of wetland area and function at both local and regional scales (Brody and Highfield 2005). Indeed, LaPeyre et al. (2001) found that states with a wetland management plan understand their resources and relevant actions for management better than states lacking a wetland management plan. More comprehensive land use planning that identifies high priority wetlands would allow land managers, developers, and individual landholders to make more informed decisions about land acquisition, and gives them the ability to weigh the potential benefits and costs associated with development. Designating ecologically significant wetlands in advance of development would allow for the avoidance of high priority sites, thereby connecting larger regional management goals (and ecological function), with site-by-site permitting decisions. Brody and Highfield (2005) argue, for example:

> A clear understanding of the adverse impacts caused by urban development and resource degradation can assist planners in mitigating loss of ecosystem structure and function. When incorporated into a planning process and final plan, this information communicates the importance of protecting wetland function and integrity at the watershed level (p. 173).

From the perspective of land developers, better regional planning and prioritization of high-value wetlands provides increased certainty and decreases risks associated with the existing permitting process. For example, a senior executive in a land development company in Alberta indicated that improved watershed planning would be an additional tool that could be used to help evaluate future projects, and:

> If there [are] areas of wetlands that are significant, well then if we know that up front, we wouldn't go out and purchase them and try to develop them. (Sr. Executive, Land Development Company, personal communication, June 2009)

This sentiment was echoed by a government employee who said:

> I think the [wetland protection and conservation] debate needs to be taken up to a land use discussion to talk about what areas of wetlands do we want to preserve? Where should we keep them, where should we not? Where is it okay to develop, where is it not? It's a broader context, and I find that our [wetland approval] process tends to get leveraged a little bit in those discussions. (Approval writer, personal communication, August 2009)

Despite the existence of available technologies to assist in the prioritization of wetlands for protection, such as GIS-based synoptic land cover maps, rapid ground-based assessments, and intensive field assessments (Brooks et al. 2004), many land use planners do not prioritize significant wetlands or wetland communities. The failure to prioritize is often due to limited wetland mapping, inadequate wetland assessment methodologies, and poor linkages between wetland management actions and outcomes (LaPeyre et al. 2001). The result is that rare, unique, or high-value wetlands are treated with the same regard as common or low-quality wetlands, and few barriers to their loss have been brought to bear, contributing to persistent and incremental losses of wetlands. Murphy et al. (2009a) concurs, suggesting that even new and stricter rules that favor wetland avoidance in the United States "allow for a project-by-project analysis of mitigation that need not look at the entire watershed and its needs" (p. 15).

Ambiguous and competing goals within and between government agencies can also contribute to the lack of prioritization and planning in wetland regulation and management at various scales. Without clear goals for maintaining wetland ecosystem function or protecting wetlands that are highly valued socially, simple rules of minimizing harm and trading-off one wetland for another has become the norm (Mann and Goldman-Carter 2008; Ehrenfeld 2000). An Alberta example of this shows that land use planning and regulatory decisions are made at different scales by multiple governments and agencies, including: municipalities for land-use zoning and bylaws; Alberta Energy for mineral rights; Alberta Sustainable Resource Development for forest resources and public lands; Alberta Environment for water and air; and Fisheries and Oceans Canada for fish and fish habitat. To further complicate matters, wetland policy implementation varies between the white zone (the southern one third of the province that is mostly private land and dominated by agricultural land use) where wetland impacts are regulated by an interim wetland policy, and the green zone (the northern two thirds of province comprised primarily of publicly owned forested lands) where the interim policy does not currently apply. This fragmentation of decision-making and general failure to better integrate planning at multiple scales has contributed to the ineffectiveness of the wetland policy in Alberta.

Divergent goals for wetland management can also occur between regulators and restoration service providers (ELI 2006). In this case, the intention of (or task assigned to) the restoration service provider is to meet a specified goal or set of minimum criteria to ensure, for example, a no net loss of wetland area, even if the compensatory wetland is not of the same replacement value as the wetland that was lost. Indeed, many in-lieu fee programs in both Alberta (personal communication, August 2009) and the US (ELI 2006) allow restoration service providers to accept wetland compensation funds before mitigation sites are even identified or secured. There are also concerns in Alberta that without more coordinated planning, wetlands that have been restored or avoided will remain vulnerable to future incursions, particularly in areas where adjacent land values rise substantially, as they have in the more urbanized southern portion of the province and in northeastern Alberta where oil sands production is the dominant industry.

Reconciling this pluralism of goals at multiple scales of planning is a significant challenge in the management of wetlands across jurisdictions, and has been described by Huppes and Midden (1991) as a great social dilemma in wetland policy. Finding a balance between site-specific decision-making that focuses on the management of a single wetland, versus adopting a broader and more regional approach to wetland permit decisions, requires a fundamental (and

likely structural) change in how wetlands are regulated. As Huppes and Midden (1991) suggest, "it is not so much individual projects that have to be improved, on an ad-hoc basis, but the overall development strategy" (p. 204); thus, the current approach in the US and Alberta of simply focusing on wetland impacts, permitting, and compensation at the project-level needs to be re-evaluated. Providing more clarity around the most appropriate scale (or scales) at which the alternatives analysis, and thus avoidance, should be applied would go a long way in resolving some of these issues in the US. In Alberta, the introduction of regulation that requires both a site-specific and a regional evaluation of impacts would contribute towards a more ecologically relevant approach to wetland management.

As a caveat, land use planning at the watershed level is not an answer in and of itself for integrating broader wetland values into permitting decisions. Throughout the land use planning literature are examples of plans and policies that have been adopted with little or no attempt to measure progress toward achieving stated goals and objectives (Wenig 2006; Seasons 2003; Baer 1997). Brody and Highfield (2005) summarized a host of studies and concluded that far more effort is put into planning than is accorded to the details of implementation. Similarly, in Alberta, there have been a number of elaborate land use planning efforts that have not resulted in measurable land use changes, such as new regulations and prioritized land uses (Wenig 2010; Fluet and Krogman 2009). Following through with effective implementation of land use planning and wetland prioritization is as important as the process of planning itself, and requires sufficient allocation of resources (e.g., financial and personnel) to be successful.

Wetlands are economically undervalued

The inexorable demand for developable land has resulted in the emergence of market-based mechanisms that have re-focused the discussion away from avoiding and minimizing wetland impacts, towards a more permissive orientation that allows for the "exchange" of wetland area or function between impact and compensation sites. The emergence of wetland banking and in-lieu fee payments has, in part, been driven by the perception that wetland avoidance in areas of economic conflict, such as residential subdivisions, is impracticable because the "assumed" value of wetlands is often much lower than the more immediate and tangible wealth generated by development. While accounting tools for ecosystem services do exist, they are complex (Moeltner and Woodward 2009) and are employed by relatively few specialized resource economists; consequently, the substantial economic value that flows from wetlands in the form of ecosystem goods and services (Moeltner and Woodward 2009; Costanza et al. 2008; Birol and Cox 2007; Boyer and Polasky 2004; Turner et al. 2000; Mitsch and Wilson 1996) is rarely considered in the permitting process.

Increasingly, off-site wetland exchanges are favoured by permittees because they are seen as being faster, easier, and more cost-effective than avoidance. The use of off-site compensation mechanisms also allows land developers to pass on the liability for meeting permit conditions for compensation to a third party, such as a wetland broker or restoration agency. It is for these reasons that the use of in-lieu fee payments in Alberta has increased substantially over the last 5 years, as articulated by one government regulator who said:

> You really have to dig at the avoidance and mitigation piece…a lot of proponents, especially in the land development side of things, they just want to skip right to, "Let's write a cheque". (Approval writer, personal communication, August 2009)

This approach to simply "bundling" wetland functions and services and exchanging them across long distances has led to wetlands being "abstracted from their place-specificity" (Robertson 2000, p. 478), and has resulted in broad changes in the distribution, type, size, quality, and connectivity of wetlands. For example, in many cases we have observed in Alberta, wetlands have been replaced out-of-kind (i.e., not type-for-type), and many small wetlands have been replaced by a single large wetland, often in a different watershed. Further, decisions about where to locate compensation sites in Alberta are rarely driven by ecological criteria, but are instead influenced heavily by land availability, as articulated by a wetland restoration agency employee who said:

> The controlling factor for wetlands in the province, even though the water is provincial

> jurisdiction, [is that] the ownership of that land is private…if you could just go out and rebuild [wetlands] wherever you wanted it'd be real easy to do, but unfortunately they have to have approval from those landowners. (Wetland restoration agency employee, personal communication, August 2009)

Robertson and Hayden (2008) have also reported a trend in the Chicago region where mitigation banks are frequently located in areas where land value prices are considerably lower than at the site of impact. This arguably creates a large subsidy for industry and land developers who are able to buy credits in a wetland bank for far less money than they receive when their product is sold in the marketplace. While private interests gain considerably in this arrangement, the public largely pays this subsidy in the form of lost ecosystem goods and services (de Groot et al. 2010; Mitsch and Gosselink 2000), and there are often unanticipated social costs associated with the redistribution of wetlands through the use of compensation (BenDor et al. 2008; BenDor et al. 2007).

The reliance on wetland banking or in-lieu fee payments as a mechanism to replace wetlands assumes that the values, functions, and services provided by the compensatory wetland are in some way equivalent to those that were lost, and are thus fungible (items freely interchangeable with another to satisfy an obligation). Where wetlands are assumed to be fungible, trade in these wetlands grows and the demand for comparability emerges. In Alberta, all of the government regulators we interviewed indicated that the most common metric used for comparability or equivalency between impacted and compensatory wetlands is area, with very little consideration given to wetland functions or services. Wetlands have thus become a commodity in a market where the measure of comparability between the items being exchanged disregards ecological and social values and functions. As many other scholars have argued, wetlands vary considerably in their value and function by type, landscape context, and spatial scale (de Groot et al. 2010; Hein et al. 2006; Mitsch and Gosselink 2000); therefore, it is difficult to meet the goal of maintaining the biological, physical, and chemical integrity of wetlands in a market where area is the only criteria used to assess comparability.

"Techno-arrogance" associated with wetland creation and restoration results in increased wetland loss

The term "techno-arrogance" has been used by other scholars to describe humankind's approach to using technology to "solve" problems in the natural world, such as climate change, alien species invasions, or toxic pollutants, which have come about through anthropogenic activities (Meffe 1992; Ehrenfeld 1981). This thinking aptly characterizes the emerging industry of wetland creation and restoration in North America. Underlying the notion that wetlands can be "created" is an implicit "faith" that with sufficient money, engineering, heavy equipment, and selection of materials, a wetland can be designed to fully mimic the values of a natural system as if it were a simple piece of machinery. In Alberta, there has been increasing pressure for the government to accept naturalized storm water management facilities (NSWMF) as complete or partial compensation for the loss of natural wetlands in urban growth areas. While these facilities are highly engineered and require continuous maintenance, many proponents argue that NSWMF are of higher quality than the wetlands they are replacing, as expressed by one land developer who said:

> We have to come up with a new scenario where we actually can recreate [the wetland]. The outline of that wetland is the same as it is in a natural state, but it'll be in an urban environment and fed [by] storm water through a pipe, and it'll be much better, at least aesthetically, than it is today. (Sr. Executive of a land development company, personal communication, August 2009)

The idea that a constructed wetland that visually resembles a natural wetland is adequate compensation ignores that wetlands grow and develop according to a myriad of highly variable inputs over time, including stochastic weather, random arrival events of species, competition, surface and groundwater interactions, and many others. The fluctuations and interactions of wetland ecosystems are more akin to human metabolism than they are to an automotive engine, with dynamic interacting components such as wetland soils, hydrologic regimes, riparian zones, and water chemistry that are linked to their surroundings. Constructed wetlands must grow, mature, and evolve,

often requiring decades to centuries to stabilize and broadly resemble naturally occurring wetlands. Such time frames are rarely considered in the price of compensation.

Despite the complexity of wetland ecosystems, optimistic and naive land developers, economists, engineers, and policy makers often argue for compensation over avoidance, confident in the notion that constructed wetlands can adequately replace the values and functions of a natural wetland. The lack of focus on wetland avoidance allows for engineered compensatory wetlands to receive more political and economic value than their natural counterparts, as they provide decision-makers the options, flexibility, and negotiation room beyond a hard and fast requirement to relocate the proposed development to a non-wetland site. The premise of compensatory offset wetland policies is that habitat loss can be mitigated through the creation or restoration of habitat that is equivalent to that which was lost. The challenges associated with measuring, let alone reproducing, the full suite of ecological, social, and economic values and functions of a natural wetland makes the reliance on this policy approach untenable in all cases, and highlights the need to give greater consideration to avoidance in the mitigation sequence.

Inadequate enforcement and compliance of wetland law and policy

Enforcement and compliance are key components to the success of any wetland regulatory program. The focus of enforcement action is on preventing "front-end" violations; that is, ensuring that wetlands are not filled without first securing a government permit or approval. For many wetland programs, ensuring that a permit has been issued prior to the loss of a wetland is a difficult task, as illustrated by a Massachusetts study that found more than 50% of the acres filled in 2001 were "illegal or likely illegal" and occurred without a permit (MDWM 2008, p. 15). The problem of illegal wetland filling is certainly not unique to Massachusetts; in Alberta, an environmental consultant we interviewed estimated that up to twenty percent of their clients had impacted a wetland prior to securing an approval (Sr. Environmental Scientist, personal communication, July 2009). Many in Alberta feel that this failure is due primarily to ignorance about the law and confusion over private versus public property rights, as articulated by one government employee who said:

> There is a large segment of the [agricultural] producer population that doesn't understand that bodies of water are crown land. [The wetland is] on their land, it's surrounded by [their land] – it must be theirs. (Alberta Government employee, personal communication, May 2010)

While there are clearly enforcement problems in many jurisdictions, there is also a growing need for "back-end" monitoring to ensure that compensation sites are performing adequately and are meeting the conditions set out in the permit. The list of studies documenting non-compliance in the United States is long (for example, see Reiss et al. 2009; Brown and Veneman 2001; Turner et al. 2001; Zedler and Callaway 1999), and clearly articulate the general failure of permit holders to replace wetland functions through off-site compensation (Burgin 2010; Cole and Shafer 2002; Malakoff 1998; Roberts 1993; Spieles 2005; Zedler 1996). The lack of government oversight to follow-up and ensure that the conditions of approvals for wetland losses are met over an appropriate timeframe reinforces the preference for compensation over avoidance; if permit holders are not held accountable, then compensation is much easier and economical than avoidance.

There are many recorded failures to meet the ecological conditions stipulated in wetland permits, yet few studies have examined why regulatory compliance has been so weak. One such study, conducted by the United States Government Accountability Office (GAO 2005), highlighted a number of major shortcomings of the regulatory process, including a general reluctance by the regulators to sanction violators, preferring instead to rely on negotiation to resolve the contravention. In many cases, legal recourse for non-compliance was not an option, as the conditions of the permits were not specific enough to allow for enforcement action against the violator, harkening back to the simple and vague language mentioned earlier.

In Alberta, an Auditor General's report released in 2010 criticized the government for its failure to adequately follow-up on wetland approvals to ensure that wetland compensation requirements were being met, and insisted that "[the Department of]

Environment needs stronger systems to ensure that … approval holders comply with the conditions in their authorizations" (AGA 2010, p. 55). The lack of follow-up action appears to be related to the administrative structure of the compliance and enforcement program, in which staff are primarily focused on responding to violations that come to the attention of the government through public complaints or self-reporting (Environmental Protection Officer, personal communication, July 2009). Further, Department of Environment efforts are focused almost entirely on enforcement action for violations that occur without an approval, rather than sanctioning proponents who violate the conditions of an existing approval; once an approval for a wetland impact has been issued there is very little credible threat of sanction for non-compliance. As one government approval writer pointed out:

> The department is really good at issuing the approvals and doing the up-front work … we're not as good as following up with the monitoring and the back-end stuff, just because you get busy with the next project. There's always something coming up, the next fire to manage. (Approval writer, personal communication, August 2009)

This reactive, rather than proactive, approach to wetland regulation in Alberta appears to be related, at least in part, to a lack of government capacity and resources, as expressed by another approval writer who said:

> I think we need to be more proactive, and probably any person that you talk to would agree with that statement – that the government needs to be proactive, but it's a matter of resources … it's pretty obvious to me that we're somewhat understaffed in terms of our ability to deal with some of these approval situations, and probably even more so in the enforcement and compliance end of things where we just don't have the capacity to be proactive. We're a reactive organization right now. (Approval writer, personal communication, June 2009)

Some authorities claim that increased oversight by regulatory agencies, such as more frequent interaction with permit holders, regular site visits, and more frequent enforcement actions, could improve compliance outcomes (Reiss et al. 2009; Schulte-Hostedde et al. 2007; NRC 2001). More rigorous record keeping (Minns et al. 1996; Kentula et al. 1992) and better coordination of policy within and between jurisdictions and agencies responsible for wetland permitting (Austen and Hanson 2007; Race and Fonseca 1996) have also been suggested as a means for achieving better compliance. By improving compliance, not only would outcomes for compensatory habitat creation be improved, it may act as an adequate deterrent if the costs associated with meeting compensation requirements outweighed those of avoiding the wetland in the first place.

Alternatives to address key failures in wetland avoidance

To address the key failures in wetland avoidance described above, we recommend experimenting with a suite of policy tools, some of which are already in place in select jurisdictions, which would better link avoidance mechanisms with land use planning and regulation. Below we provide some thoughtful, though mostly untested, considerations for re-instituting avoidance as a workable option in wetland management, including: watershed-based planning; more comprehensive economic and social valuation of wetlands; and long-term citizen-based monitoring schemes.

Watershed-based planning

Watershed planning can provide an ecologically relevant alternative to the current piece-meal and compensation-focused approach to land use planning. The National Research Council report (2001, p. 4) on wetland losses concluded that:

> A preference for on-site or in-kind mitigation should not be automatic, but should follow from an analytically based assessment of the wetland needs in the watershed and the potential for the compensatory wetland to persist over time.

By placing wetlands within a broader landscape context, watershed planning can help to prioritize the conservation of high value wetlands, or identify land uses that may not be compatible with regional wetland conservation goals (Chavan et al. 2008; Brooks et al. 2006; Stein and Ambrose 1998). Using science-informed watershed plans, wetlands can be managed within a larger hydrologic and ecologic regime that

considers issues of water quantity and quality, habitat connectivity, and biodiversity in all of its complexity (NRC 2001; Margules and Pressey 2000).

A powerful science-based decision support tool that can be utilized for conservation planning at the watershed scale is systematic conservation planning (SCP). Systematic conservation planning is a rigorous, transparent, and repeatable framework that attempts to reduce the "uninformed opportunism" of traditional conservation planning by integrating multiple criteria (e.g., ecological, sociopolitical, economic) into broader landscape planning and decision-making (Pressey and Bottrill 2008; Sarkar et al. 2006; Margules and Pressey 2000). The framework for systematic conservation planning generally consists of several key steps (Groves 2003; Margules and Pressey 2000): setting conservation goals; identification of conservation criteria; development of a conservation strategy; identification of conservation areas; implementation and prioritization; and finally, monitoring and management. By utilizing this framework and systematically identifying wetland conservation criteria—the elements of biological and physical diversity that will be the focus of planning efforts—meaningful conservation goals can be set within a watershed, and priorities for wetland conservation, protection, or alternative management approaches can be identified in advance of development.

One key strength of SCP is the potential to involve local resource users and other key social actors at various stages in the process, including setting conservation goals, developing criteria and management strategies, and monitoring outcomes (Sarkar et al. 2006; Pierce et al. 2005; Cowling and Pressey 2003). Through SCP, local and regional conservation plans can be tailored to reflect the local context, allowing for the inclusion of a wide variety of perspectives and values in the planning process. The resulting user-friendly and target-driven planning tools that are the products of SCP can be used by authorities at various jurisdictional levels, from municipal to regional, to help inform land use planning and decision-making (Pierce et al. 2005). Wetlands can thus be framed in both time and place by iteratively and adaptively identifying future land use pressures and potential risks, thereby allowing for a greater emphasis being placed on the avoidance of wetlands that have been identified as being high-priority for management.

More comprehensive watershed-based planning also allows for the development and use of region-specific wetland functionality indicators that can be derived through the use of benchmark or reference sites. Matthews and Endress (2008) suggested that the use of benchmarks could help agencies with permit approvals, selection of mitigation site locations, calculation of compensation ratios, development of performance criteria, and implementation of post-construction monitoring protocols. Bedford (1999) argued that wetland restoration will be more successful if individual wetland restoration decisions are made in light of past and present regional profiles, and Olsen and Christie (2000) highlighted the importance of locally and socially relevant indicators to build local ownership of coastal (wetland) management, especially for direct users/abutters of wetlands. Watershed planning can also provide rich opportunities for more place-based and prescriptive restoration goals (Stanturf et al. 2001; Olsen and Christie 2000), thereby addressing some of the competing goals (individual to structural) that limit overall restoration effectiveness.

As landscape-level approaches to wetland management replace previous command-and-control style regulations, planners among different levels of government will need to coordinate carefully (BenDor and Doyle 2010), particularly in areas where watershed plans cross jurisdictional boundaries. The coordination required for watershed management can help clarify jurisdictional issues and uncertainties (ELI 2009), and improve interagency communication (Olsen and Christie 2000). While BenDor et al. (2007) found tension between local authorities as watershed-based management proponents, such tension was not necessarily disadvantageous, as it provided an avenue to help local and extra-local stakeholders more clearly articulate goals for restoration projects. Ehrenfeld (2000, p. 2) acknowledged such tension as an important component of projects because it "sets expectations, drives the detailed plans for actions, and determines the kind and extent of post-project monitoring".

Globally, climate change poses considerable threats to wetlands due to forecasted changes in hydrological regimes (Johnson et al. 2010; Acreman et al. 2009). As climate change planning is increasingly incorporated into natural resource management, watershed-based planning offers an

effective mechanism in which to accommodate the impacts of climate change on wetlands (Erwin 2009; Simenstad et al. 2006). In certain parts of the world where climate change begins to negatively impact water resources, the water storage, filtration, carbon sequestration, biodiversity maintenance, and other ecological goods and services offered by wetlands will become increasingly valuable. Thus, watershed planning will allow for more accurate assessments of a region's vulnerability to climate change-related risks, such as drought (Hurd et al. 1999), and will be an important tool for assigning priority for the management of high-value wetlands.

In making this recommendation we acknowledge that this approach is not novel, and has previously been applied in some jurisdictions in one form or another, with varying degrees of success. For example, the US Environmental Protection Agency has an Advanced Identification (ADID) planning program that identifies wetlands that are "suitable or unsuitable for the discharge of dredged and fill materials", with the intent of providing local communities with "information to help them better understand the values and functions of wetlands in their areas" (EPA 2009). While this approach has merit, the program is not widespread and is not mandatory; thus, it is likely of limited use in planning and management at large scales. The concept of watershed planning also confronts tensions over the management of common pool resources on private property. This conflict is very real and presents itself as a significant challenge in the development and implementation of any watershed plan. For example, Ando and Getzner (2006) examined the role of land ownership in wetland conservation decisions in Australia, and found that wetlands were more likely to be protected on public versus private lands, and concluded "ownership status is a significant factor in the pattern of wetland conservation" (p. 302). While land ownership issues are a barrier to watershed-level planning and conservation, there is an emergence of new policy tools that may offer some opportunities in this regard, including biodiversity off-sets (ten Kate et al. 2004), transfer of development credits (Pruetz 2009), and reverse auctions (Packman 2010), to name only a few. Whether these tools are able to overcome the challenges of managing wetlands on private property remains to be seen.

More comprehensive ecological and social valuation of wetlands

Making informed decisions about the economic trade-offs associated with a given permit application are difficult for both developers and wetland regulators because the ecological, social, and economic values of wetlands are difficult to identify, combine, compare, value, and aggregate, resulting in a chronic undervaluation of wetland habitats (Costanza et al. 2008; Carlsson et al. 2003; Turner et al. 2000). Under current accounting practices and market orientation, the economic value of land adjacent to a wetland often exceeds the "assumed" value of the wetland itself, which leads to the belief that wetland avoidance is an impracticable economic option. This tendency to perceive wetlands as economic liabilities may be overcome if ecosystem services and social values were accounted for in permit and planning processes. Incorporating economic and social valuation processes into wetland permit approvals may help link the desired ecosystem goods and services to benefit cost analyses of areas being considered for development. In turn, increased economic values attached to those broader ecosystem and other non-market services (e.g., aesthetics, recreation, education) may provide disincentives to wetland development and help to focus development in non-wetland areas. By including environmental and social considerations in the accounting standards under which wetland regulators and land developers make their decisions, the notion of wetland compensation takes on a new meaning. It becomes much more costly to compensate for wetlands loss when the "true cost" of that loss is borne by the permittee, rather than the public.

Long-term citizen-based monitoring schemes

One of the reasons identified for the policy failure of wetland avoidance is inadequate enforcement of compensation requirements. This lack of enforcement can occur because of shrinking budgets for enforcement personnel, or it may be due to a deficiency in the quality or quantity of information available to enforce regulations, such as inadequate assessment or monitoring data. If wetland regulators do not have reliable data on the performance of natural, reclaimed, or constructed wetlands, it becomes very

difficult to make evidence-based land use planning decisions. At the same time, environmental policy in North America is experiencing a move away from command-and-control style management towards self-enforcing market-based policies (Daley 2007), and increasingly towards resilience management such as adaptive co-management, networked, or collaborative environmental governance (Armitage 2008; Reed 2008).

One type of program that has strong potential in this emergent policy space is the use of long-term, citizen-based monitoring schemes to help manage local wetlands. These schemes would not only encourage local stewardship of wetlands, but would also provide data to help regulators gauge approval compliance, potentially resulting in improved environmental outcomes. For example, citizens have been trained to identify functional and structural characteristics of wetlands, and report on these measures in a consistent, reliable manner, at low cost to local institutions (Koontz and Thomas 2006). Inherent to this program might be an empirical expression of human valuation and appreciation for the wetlands, giving greater opportunity to measure the intangible social value of these habitats. With this new data and more engaged local citizens, it is more likely that wetlands will be avoided during development, as compared to decisions that are made in the absence of data and a locally organized wetland group. The inadvertent creation of local political will and interest in wetlands may be an antidote to public apathy, resulting in more careful scrutiny of development plans and the elevation of avoidance as the key policy activity for wetlands protection.

While the use of citizen scientists is a relatively recent phenomenon, citizens are increasingly being included in conservation and restoration planning (Currin et al. 2008; Oscarson and Calhoun 2007) and have been found to be effective assistants to local land managers (Sharpe and Conrad 2006). If a standard protocol is used (e.g., Christmas Bird Count), a diverse public can be used as a local resource that is capable of collecting data on both wetland structure and function (Currin et al. 2008). By utilizing citizen participation, not only are costs lowered compared to traditional data collection methods, but local stewardship is also promoted, with local communities benefiting directly from the educational value of participation (Hudson 2001). The outcome may be a more engaged and informed citizenry that can bring political pressure to bear on the issues of wetland conservation, making wetland avoidance a more practicable option from a sociopolitical perspective. For example, Meyer and Konisky (2007) found that local environmental institutions that have included a broad array of community-based efforts to increase local participation in environmental decision making, particularly though local bylaws that protect wetlands, outperform jurisdictions that lack similar bylaws on numerous wetland measures.

Conclusions

Wetland avoidance needs to be reinstituted as the first, and most preferred option for wetland management in jurisdictions that utilize the mitigation hierarchy. While there is recognition in the literature that wetland avoidance is not practicable in all circumstances, there is overwhelming consensus that in order to meet wetland management goals, more emphasis needs to be placed on avoidance. Government decision-making is highly influenced by the subjective and ill-defined notion of *balancing* development and the environment; hence, governments are often fraught with a permissive orientation that makes avoidance optional, or even an afterthought. Where wetland avoidance is ignored, impact minimization and compensation become the default regulatory processes for wetland conservation. We suggest that decision makers and regulators need to better consider the public goods and services that flow from wetlands, and account for these losses in all compensation schemes using the best social and ecological data available. A move towards a true cost accounting approach may help address the inequitable behavior of societies where a select number of individuals reap the short-term benefits of wetland loss, while the public pays the cost for generations to come.

The literature clearly suggests that avoidance is not synonymous with preventing wetland loss. A proactive approach to protecting wetlands requires land use planning that safeguards the ecological, social, and economic value and function of wetlands, both locally and within the larger landscape. We suggest that this can be better achieved by systemically planning for wetland conservation in advance

of development, engaging the public in the monitoring and management of wetlands, and developing a more comprehensive valuation scheme that acknowledges the complex ecological and social values of wetlands at multiple spatial scales. For meaningful areas of natural wetlands to remain in jurisdictions that rely on the wetland mitigation sequence, the public's ability to identify and communicate wetland values will need to develop commensurately with the unfolding development being leveled at wetlands, as this provides the greatest long-term hope for sustained public interest in policies that promote wetland conservation.

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Carbon Trading

a critical conversation on climate change, privatisation and power

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what next

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This issue of *Development Dialogue* is the second in a series of *What Next* project publications. It also forms part of a new phase in the journal's history. *Development Dialogue* has been given a fresh look - a new cover design and a new layout. At the same time we are introducing a new and simpler numbering system, consisting of a running number along with month and year of publication. This issue is No. 48 in the series of issues published since 1972. The length of *Development Dialogue* issues may vary more than before. We hope the new design of the journal will meet with readers' approval.

Development Dialogue will continue to provide a space for pioneering ideas, and the essential character of the journal will remain unchanged.

This issue of *Development Dialogue* is published in cooperation with the Corner House.

Larry Lohmann works with the Corner House, a small research and solidarity organisation in the UK. He is the co-author of *Pulping the South: Industrial Tree Plantations and the World Paper Economy* (with Ricardo Carrere, 1996) and *Whose Common Future? Reclaiming the Commons*, (with Simon Fairlie, Nicholas Hildyard and Sarah Sexton, 1993), and co-editor of *The Struggle for Land and the fate of the Forests* (with Marcus Colchester, 1993). Since then, he has published articles and book chapters on climate change, land rights, globalisation, racism, forest conflicts, development, environmental change in Southeast Asia and the politics of cost-benefit analysis. During the 1980s he lived and worked in Thailand, most of the time with non-governmental organisations.

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Editorial Note

It is now accepted worldwide that the globe is warming to such an extent that the livelihoods of large swathes of the world's population are under serious threat. Violent and frequent storms wreck people's habitats; unpredictable weather drastically changes conditions for agriculture; new health threats emerge. As a result, awareness of global warming is increasingly influencing thinking in both the South and the North.

The irony is, however, that some of the responses to the global threat of climate change are likely to cause new and severe problems, which, in a worst-case scenario, could actually increase global warming. As this special report shows, this seems to be the case with carbon trading – a grandiose market scheme set up as the world's primary response to the crisis of climate change.

The main cause of global warming is rapidly increasing carbon dioxide emissions – primarily the result of burning fossil fuels – despite international agreements to reduce such emissions. The trouble is that despite being aware of the serious situation, very few decision-makers are ready to tackle the problem at its roots. Instead of reducing the extraction of fossil fuels and searching for other solutions, current carbon-trading policies, in practice, favour the further exploitation of these fuels. Furthermore, new tree plantations, which are claimed as a means of mitigating the consequences of increased carbon dioxide pollution, often drive people out of their traditional living grounds and destroy biological diversity.

This special report forms part of the Dag Hammarskjöld Foundation's *What Next* project. It focuses on carbon trading and is intended to influence current climate politics. In the debate on the Kyoto Protocol few actors have expressed a critical view. It is high time, for the purposes of debate and policy-making, to put the spotlight on the core problem – fossil fuel extraction and consumption.

This publication, therefore, takes a broad look at several dimensions of carbon trading. It analyses the problems arising from the emerging global carbon market pertaining to the environment, social justice and human rights, and investigates climate mitigation alternatives. It provides a short history of carbon trading and discusses a number of 'lessons unlearned'. Nine case studies from different parts of the world provide examples of the outcomes – on the ground – of various carbon 'offset' schemes.

The publication project has matured over time. It was first discussed in connection with an early Dag Hammarskjöld *What Next* seminar in July 2001 on 'Addressing Nanotechnology and Other Emerging Technologies in the ETC Century'.

The editor and main author, Larry Lohmann, who works with The Corner House – a small research and solidarity organisation located

in Dorset, UK – pointed the Foundation to the increasing concern about carbon trading and the need for consolidation of critical perspectives. As a result, the Dag Hammarskjöld Foundation, in collaboration with several other civil society organisations, organised an international seminar in South Africa in October 2004. The seminar led to the 'Durban Declaration on Climate Justice' and gave rise to the Durban Group for Climate Justice, which is now playing an increasingly important role in climate politics. The meeting was also the starting point for the writing of this report. At various times in 2005 and 2006, Larry Lohmann worked on the project at the Dag Hammarskjöld Foundation as a Scholar-in-Residence.

Members of the Durban Group have played an important role in the process by contributing to and commenting on the text. An international network of independent organisations, individuals and people's movements, the Durban Group is committed to helping build a global grassroots movement for climate justice, mobilising communities around the world and pledging solidarity with people opposing carbon trading on the ground.

This special report is a thorough, well-documented work, the purpose of which is to inspire critical and far-reaching discussion. Although the topic is complex, it is our hope that the wealth of information the report contains and the dialogue form in which it is written will contribute to broader understanding of the problem and deeper engagement in one of the most important issues of our time.

⋆ ⋆ ⋆

The Foundation's *What Next* project, of which this special report is part, aims to contribute to the discussion of crucial development issues in the next few decades. A diverse group of concerned people has come together to engage in intense dialogue. The project is a sequel to the Foundation's *What Now: Another Development* initiative of 1975.

The *What Next* deliberations are being compiled in several publications. In addition to this special report, there will be a number of volumes of *What Next* papers. The first, entitled *Setting the Context*, was published in July 2006. Volume II and III will follow. *The What Next Report 2005-2035*, to be published before the end of 2006, draws on the major debates of the *What Next* process. It presents a number of possible scenarios for the next three decades, and includes concerns about various 'solutions' to climate change such as large-scale 'geo-engineering' schemes as technological fixes to the problem.

Olle Nordberg, Niclas Hällström, Robert Österbergh

Chapter 1
Introduction
A new fossil fuel crisis

In which the growing climate crisis is traced mainly to the mining of coal, oil and gas; the dangers to survival and livelihood are outlined; the political nature and implications of the problem explored; and reasonable and unreasonable solutions sketched.

We've all heard about climate change. But is it really something we need to be worried about?

Yes. The climatic stability that humans have grown used to over the last few centuries may be ending sooner than we think. The results are likely to include intensified droughts and floods, changed weather patterns, agricultural breakdown, ecosystem disruption, rising sea levels, epidemics, and social breakdowns that ultimately threaten the lives or livelihoods of hundreds of millions of people.

What's the cause?

Like many other social problems, climate change is closely tied to the burning of oil, coal and gas. Fossil carbon is being taken out of the ground, run through combustion chambers, and transferred to a more active and rapidly circulating carbon pool in the air, oceans, vegetation and soil. Some of this active carbon builds up in the atmosphere in the form of carbon dioxide, trapping more of the sun's heat, warming the earth and destabilising the climate. The carbon build-up – up to 90 per cent of which has come from the North – has been made worse, especially over the last century, by unchecked land clearance and the spread of industrial agriculture.[1]

The difficulty is that fossil carbon is a lot easier to burn than it is to make. It took millions of years for plants to extract the carbon from the atmosphere that makes up today's coal, oil and gas deposits. It's taking only a few centuries to burn it. Today, the world combusts 400 years' worth of this accumulated, compressed biological matter every year,[2] three to four times more than in 1950. This carbon will not be able to lock itself safely up underground again as coal, oil or gas for many, many millennia.

Aren't there any other ways that the earth can reabsorb this carbon?

Yes, but they take even longer. The weathering of silicate rocks – aided by water and the activity of plants – removes some carbon dioxide from the atmosphere. Carbonates accumulating on the sea floor through weathering, runoff or the accumulation of carbon in the shells of living organisms are eventually pushed under continental plates at ocean edges, finding their way to the atmosphere again in volcanic activity. This process, taking millions of years, isn't going to solve the current crisis.

So the carbon that comes out of the ground stays out of the ground.

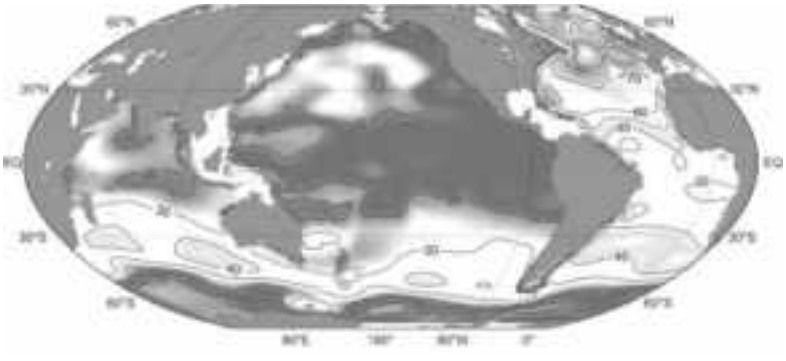
For a very long time. And once it makes its way to the surface in big enough quantities, there's no way of stopping it from building up in the atmosphere. Before the industrial revolution began there were only around 580 billion tonnes of carbon in the atmosphere. Today the figure is closer to 750 billion tonnes – the highest in hundreds of thousands of years.

Why can't trees absorb enough carbon dioxide to keep it out of the air?

Trees can absorb some of it. So can the world's oceans, grass, soil and fresh water. But they can't absorb enough of it, fast enough, to keep it from accumulating in the atmosphere. Nor can they hold onto it for very long. Once above ground, carbon constantly flows back and forth among vegetation, water, soils and air.

The oceans, for instance, can take up just so much of the new carbon pouring up from underground. They have already absorbed a third of their ultimate potential, and the new carbon dioxide dissolving in them is turning them more acid.[3]

Figure 1. Human-caused CO_2 build-up in the oceans is concentrated in the North Atlantic.



Source: US National Oceanic and Atmospheric Administration.

Plants and soil are an even more limited receptacle for fossil carbon than the oceans. Their storage potential is far less than the carbon content of the coal, oil and gas still underground (see Table 1). Living and dead biomass hold on the order of 2,000 billion tonnes of carbon, while fossil fuel companies are still planning to transfer around twice as much fossil carbon to the surface. In addition, plants and soil can only hold onto carbon for a short while before releasing it again to the air, water or soil. Finally, how much carbon land vegetation will absorb or emit in the future is highly uncertain.[4]

Table 1. The Earth's Carbon Pools (billion tonnes)

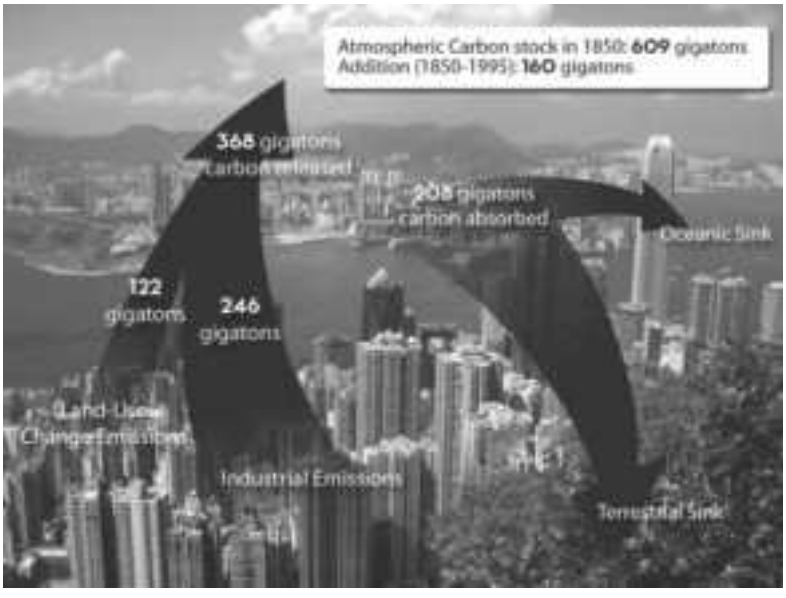
Atmosphere	720-760
Oceans	38,400-40,000
Rock (mainly underground)	75,000,000
Land biosphere	
living biomass	600-1,000
dead biomass	1,200
Fresh water	1-2
Fossil fuels	
coal	3,510
oil	230
gas	140
other	250
Annual transfer of fossil carbon to above ground carbon pools	7+

Sources: P. Falkowski et al., 'The Global Carbon Cycle: A Test of Our Knowledge of Earth as System', *Science* 290, 13 October 2000; US Energy Information Administration. Estimates of the amount of unmined fossil fuels are all highly controversial. Much higher estimates for oil (670 billion tonnes) and gas (503 billion tonnes) are given, for example, by Hans-Holger Rogner.[5] The US Geological Survey estimates about 360 billion tonnes of carbon to lie in 'recoverable' oil.[6]

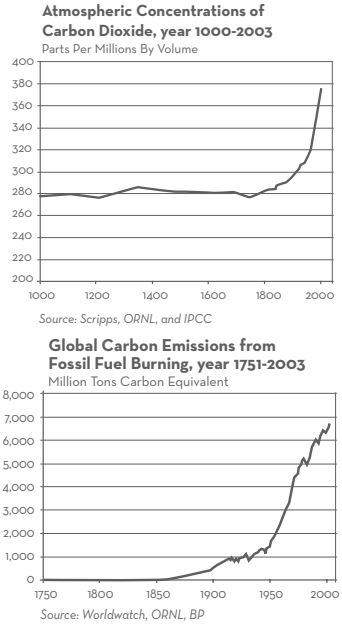
So the above-ground carbon pool in the oceans, vegetation and soil is like a bathtub with the drain plugged. As long as the tap stays on, the water just keeps overflowing.

Yes. Or to make what might be a slightly better comparison, you might look at the earth's above-ground carbon-cycling capacity, minus the atmosphere, as a dumping ground that has the ability to recycle a certain amount of the waste that is put into it, but no more. According to one estimate, between 1850 and 1995, a total of 368 billion tonnes of carbon were released globally into the atmosphere through human activities. Some 208 billion tonnes were absorbed into the oceans and into vegetation and soils, leaving an extra 160 billion tonnes in the atmosphere.[7]

Figure 2. Atmospheric carbon



Source: World Resources Institute



The current rate of accumulation in the atmosphere is over 1.6 extra billion tonnes of carbon every year. And on current trends, many times more fossil carbon will be added to the atmosphere over this century than has been added since the industrial era began.

What would have to be done to stop the overflow?

Well, there's already far more carbon dioxide in the atmosphere than there has been at any other time in the last half million years – 380 parts per million, as compared to pre-industrial levels of 280 parts per million.[8] So a lot of damage has already been done.

According to the Intergovernmental Panel on Climate Change (IPCC) in 1990, in order to stabilise atmospheric concentrations at a level less than double that of preindustrial times, greenhouse gas emissions would have to be reduced by 60–80 per cent.

So at present we're acting as if we have something like two and a half to five times the amount of carbon dump space than we really have.

Well, it's probably not possible to estimate with any certainty the earth's capacity to recycle transfers of fossil carbon with no remainder. But there's no question that the current rate of overflow is huge.

And this is definitely the main cause of climate change?

The United Nations' Intergovernmental Panel on Climate Change, perhaps the most prestigious body of climate scientists ever assembled, concludes that most of the observed warming of the last 50 years is likely to be due to the increase in greenhouse gas concentrations due to human activities.

But isn't there a lot of controversy about that?

Not much. The IPCC's judgement is now supported by the US's National Academy of Sciences, Brazil's Academia de Ciencias, China's Academy of Sciences, the UK's Royal Society, France's Académie des Sciences, Germany's Akademie der Naturforscher Leopoldina, India's National Science Academy, the Science Council of Japan, the Russian Academy of Sciences, Italy's Accademia Nazionale dei Lincei, the American Meteorological Society, the American Geophysical Union, Canada's Royal Society and the American Association for the Advancement of Science.[9] There's no dissent from it in any of 928 peer-reviewed scientific essays on global climate change published between 1993 and 2003.[10] And the few remaining contrary bits of evidence have been pretty much explained away over the last couple of years. For example, the oceans have warmed in a way that virtually rules out cyclic variations in solar energy as an explanation.[11]

OK, give me the bad news. What happens if the world's above-ground carbon dump goes on overflowing into the atmosphere?

At some point the buildup of carbon dioxide and other greenhouse gases in the atmosphere will change the climate catastrophically. As biologist Tim Flannery notes, 'There is so much carbon buried in the world's coal seams [alone] that, should it find its way back to the surface, it would make the planet hostile to life as we know it'.[12] Combustion of even a substantial fraction of remaining fossil fuels – even a few more hundred billion tonnes – could be disastrous.[13]

How bad is the situation now?

It's hard to tell what the ultimate effects will be, because the extra greenhouse gas already in the air will have long-term effects, not all of which are evident today. Global average temperatures have increased by only 0.7 degrees Centigrade since the mid-1800s. To be sure, some changes often attributed to global warming are already noticeable. For example, rainfall in mid- to high latitudes has increased, Arctic communities are increasingly threatened by coastal erosion and damaged hunting territories, Arctic sea ice and

permafrost is dwindling, and stress is growing on plant and animal species ranging from polar bears to butterflies and boreal forest trees.[14] The proportion of the global population affected by weather-related disasters doubled between 1975 and 2001.[15] But such changes are nothing compared to what's on the way. In its Third Assessment report in 2001, the IPCC projected that, on current trends, the planet would warm up by between 1.4 and 5.8 degrees Centigrade by 2100. Many researchers now believe that the warming could be far more severe.[16] Whichever estimates are used, it is likely that by the end of the century the earth will be hotter than at any other time in the last two million years.

Two million years! Will human beings be ready for that?

Little will have prepared them for it. At that point, climatic conditions will probably be not only outside the historical experience of present-day humans, but outside their ancestors' physical and ecological experience as well.[17]

What are the changes that are expected?

Among the likely manifestations of climate change in this century will be:

- Less agricultural productivity, especially in hotter places.[18]
- More frequent heat waves and less frequent cold spells.
- Bigger storms, higher winds and more weather-related damage like that associated with Hurricane Katrina in 2005 and Hurricane Catarina in 2004, the first recorded hurricane in the South Atlantic.[19]
- More intense floods and, in mid-latitude continental interiors, droughts.
- Water crises associated with disappearing glaciers and snowpacks and other events.[20]
- Movement of farming to other regions, especially higher latitudes.
- Faster disease transmission and other health impacts.[21] The World Health Organization estimates that the warming and precipitation trends due to anthropogenic climate change of the past 30 years already claim over 150,000 lives annually.[22]
- Rising sea levels. Melting of the West Antarctic and Greenland ice sheets, once started, would likely become self-reinforcing (such ice masses could not form in today's climate).[23] Combined with the thermal expansion of the warmed oceans, this would ultimately cause a sea-level rise in excess of 10 metres, flooding coastal cities

and prime agricultural areas. Glaciers within the West Antarctic ice sheet are already starting to disappear, and collapse of the sheet within this century cannot be ruled out.[24]

- Species extinction and biodiversity loss.
- Increased numbers of environmental refugees.[25]

How fast is all this happening?

No one can be sure how quickly these problems will unfold, and how severe they will be. One thing scientists are increasingly concerned about is possible feedback reactions that could accelerate global warming. According to the IPCC, such effects are far more likely to make global warming worse than to mediate it.

'Humanity is performing a "great geophysical experiment", not in a laboratory, not in a computer, but on our own planet.'

Roger Revelle and Hans Suess, 1956

For example, melting of ice caps in the Arctic,[26] where the climate is changing faster than elsewhere, could lead to redoubled warming, as a highly reflective white surface gives way to a darker, more heat-absorptive ocean surface.[27] As temperatures rise, more carbon is also being lost from soils due to more rapid decomposition of organic material, creating another feedback effect.[28]

In August 2005, scientists reported that the world's largest expanse of frozen peat bog in western Siberia, spanning a million square kilometres, was undergoing 'unprecedented thawing' that could release into the atmosphere billions of tonnes of methane – a greenhouse gas 20 times more powerful in forcing global warming than carbon dioxide.[29] Some scientists fear that if the oceans are warmed beyond a certain degree, there may also be sudden, catastrophic releases of methane from methane hydrates on the sea floor previously kept quiescent through high pressures and low temperatures.[30]

The geological and ice-core record shows that climatic discontinuities caused by such phenomena have been rife in the past.[31] At times they may have driven up average global temperatures by as much as eight degrees Centigrade in the space of a human lifetime.[32]

Similarly, if dry seasons become long enough, a desiccated Amazon could burn, releasing huge biotic stores of carbon into the atmosphere all at once. If other forests followed suit, that could drive the temperature another two degrees Centigrade higher or more.[33]

Still other abrupt, nonlinear 'flips' of the climate to new equilibria are also possible. For instance, influxes of fresh water from melting ice around the North Atlantic, together with increased flow of Russian rivers into the Arctic Ocean, are capable of slowing or even stopping the 'thermohaline conveyor-belt' of the Gulf Stream. Already, a study

'Tipping Points' and 'Angry Beasts'

The climate doesn't always change gently and gradually. More and more climate scientists are pointing to the possibility that, due to global warming, the earth's climate could suddenly shift to a radically different – and radically less hospitable – state, as has often happened in the past (see main text).

Geophysicist Donald Perovich likens the climate system to a rowing boat that is rocked from side to side more and more violently, until it finally takes in water and suddenly capsizes. 'You can tip and then you'll just go back. You can tip it and just go back. And then you tip it and you get to the other stable state, which is upside down.'[36]

Veteran paleoclimatologist Wallace Broecker of Columbia University uses a different comparison: 'The earth's climate system has proven itself to be an angry beast. When nudged, it is capable of a violent response.'[37]

of ocean circulation in the North Atlantic has found a 30 per cent reduction in the warm currents that carry water north from the Gulf Stream.[34] A shutdown of the Stream would reduce the flow of Caribbean heat northwards, dropping European temperatures drastically while drying out the climate in regions such as Central and Western Asia.[35] When the current stopped about 12,700 years ago – possibly due to a sudden surge of fresh water into the North Atlantic triggered by the melting of glaciers that had dammed up an ancient lake in North America – it was for more than 1,000 years; another event lasting 100 years occurred about 8,200 years ago.

The climate, in other words, is likely to change in nonlinear and nonuniform ways. Yet even if it were possible to predict exactly how it might shift in every region, it would still be virtually impossible to track or estimate in advance the effects on living things and human societies with much confidence.

As ecosystems confront shock after shock, a raft of difficult-to-anticipate effects will radiate through communities of living things as fish, insects, microorganisms and trees shift their ranges or growth patterns or die off.[38]

The unpredictability can only increase as these shocks reverberate through social systems. Water, heating, transport, health care, insurance, legal and policing systems will all have to adapt to changes far outside their historical experience.[39]

Strange weather ahead: global warming will increase storm intensity.

Is climate change already irreversible?

It depends what you mean, and for whom. For many people, for example in some regions of the far north, it is not only irreversible but has already overturned the lives of, for example, hunters who rely on winter ice. For some bird species or coral species it is already too late. In other, broader senses, things can be turned around, even though at this stage they are bound to get worse before they get better, no matter what policies are adopted now.

If everything's so uncertain, why should we do anything? Wouldn't it be better to wait until we're sure what's going to happen?

There will always be uncertainty about the details and the timing. But what is certain is that the world is on course for severe shocks, that these will become more severe the more fossil carbon is transferred to the atmosphere, that they will threaten many millions of people, that there will continue to be surprises, and that these surprises will mostly be unpleasant.[40] That's enough to demand immediate action.

Give me the bottom line. If we don't do anything, what will climate change cost us?

Again, that's a question no one is likely to be able to find a sensible answer to. First, nobody has any idea how to calculate or estimate with any confidence the extent and effects of climate change.[41] Nor can anyone predict very well the future costs of technologies that

have yet to be developed or deployed or social changes that are likely to have multiple effects.[42] Second, no one can reasonably assign a cost to improbable but irreversible or catastrophic events when what could trigger them is so poorly understood, and when discount rates are capable of making any future disaster ultimately inconsequential in money terms.[43] Third, those effects may nevertheless be so sweeping that they undermine many of the imagined constants on which cost estimates are based.[44] To take an extreme case, if there are no markets there will be no prices. Fourth, the civilizations and human life and livelihoods that are threatened by climate change are not generally held to be for sale. No one can imagine what markets they would be sold in if they were and what their price would be, and attempts to situate them in imaginary markets are endlessly disputed. The same is true of species extinction, health disasters that affect tens of millions of people, and many other of the possible effects of climate change.[45]

But if we can't assign a price to all the possible future damage, how can we know how serious the threat is? And how will we know what level of action will be appropriate?

As Ruth Greenspan Bell of Resources for the Future has pointed out, when a loved one has a potentially fatal disease, you don't perform a cost-benefit analysis when deciding what to do. Instead, you do what is within your power to help.

We can grasp how serious the threat of climate change is by looking at the trends, looking at the science, looking at the possible effects, and not pretending to possess a knowledge that we can't achieve. The situation is bad, but imagining we can quantify how bad it is interferes with clarity of thought and with good decision-making. Even worse is trying to compare some imaginary figure for future costs of climate change with imaginary numbers for, say, future economic gains or losses associated with a transition to a more sensible energy system.[46]

The climate system is not a statistical sample of champagne bottles.

The effects of possible changes in climate, however horrifying they are, are not, strictly speaking, 'risks'. Risks can be calculated and probabilities assigned to them, allowing them to become the subject of economic calculations. For example, life insurance companies, extrapolating from history, can compile actuarial tables that will tell them the likely lifespans of people fitting various descriptions. Or, to take the classic example of champagne production used in 1921 by Frank Knight, one of the seminal thinkers about risk: 'Since in the operations of any producer a practically constant and known proportion of the bottles burst, it does not especially matter…whether the proportion is large or small. The loss becomes a fixed cost in the industry and is passed on to the consumer, like the outlays for labor or materials.'[47]

Planning for climate change requires a different kind of thinking. The climate system is not a statistical sample of champagne bottles. Climatologists do not extrapolate statistically from past trends, as insurance companies and wine bottlers do, but construct simplified, future-focused computer circulation models that yield various different scenarios.[48] The probabilities of those outcomes that can be anticipated at all can be calculated only relative to some assortment of computer models. These models may or may not incorporate relevant factors,[49] and may or may not define the full range of possible future realities (see box on p. 16: Worlds inside Computers).

So industrialised societies aren't going to be able just to keep on what they're doing, calculate their chances, and take out a little more insurance?

No. Many of the likely outcomes of climate change are going to be uninsurable. Andrew Dlugolecki, an insurance specialist formerly with CGNU (now known as Aviva), the sixth largest insurance firm in the world, speculates that, as early as 2010, abrupt or chaotic climate change could force insurance companies to charge annual rates as high as 12 per cent of insured value, forcing most businesses and individuals to drop their coverage entirely.[55] Insurance losses because of extreme weather, Dlugolecki points out, are increasing by an annual 10 per cent while world economic growth is averaging 3 per cent a year: 'By 2065 the two growth graphs cross, the world economy can no longer sustain the losses, and collapse will follow.'[56]

It's often stressed that the South will suffer most from global warming. Southern countries are estimated to suffer 97 per cent of natural disaster-related deaths occurring each year, and also face much larger economic losses than Northern countries in terms of percentage of gross national product.[57] But it's important to realise that global warming will not spare industrialised societies, as the recent New Orleans disaster suggests.

Indeed, the locked-in dependence of industrialised societies and their militaries on an enormous fossil-oriented technological and institutional system of unparalleled inertia and inflexibility creates its own special global warming vulnerabilities. Michael Northrop of Rockefeller Brothers Fund and David Sassoon of Science First Communications note in a recent business publication that 'climate change is unlike any other "risk factor" that our modern financial system has ever confronted':

> It contains no reciprocal or alternative opportunity... Climate change renders [money managers] impotent. It's a risk that can't be managed around, and the only rational course of action is to minimise its impact.[58]

Worlds inside Computers

General Circulation Models (GCMs) are miniature, closed worlds created inside computers. Consisting of tens of thousands of lines of computer code, each GCM calculates how climate might change in a particular imaginary world over decades or centuries, given certain initial assumptions.

These models – there are dozens of them in use in various places – are based on solid principles of physics. Taken together, they give a feel for how climate might change in the real world. But their usefulness can't be checked by experiment in the ordinary sense, and there are things they cannot tell us.

First, GCMs are highly simplified when compared with the real climate system. Second, all of them are likely to have left out certain mechanisms influencing climate that are not yet known.[50] This difficulty is made more serious by the fact that many models share a common heritage. 'Typically, one modelling group "borrows" another group's model and modifies it, meaning that the "new" models may retain problematic elements of those from which they were created', replicating systematic errors.[51]

Third, the global data that models use have certain limitations – limitations exacerbated by the fact that many of the data are generated by the models themselves, to fill in blanks needed to run global simulations.[52] Fourth, models are characterised by various kinds of uncertainty. For instance, they are extremely sensitive to initial assumptions, meaning that different runs will yield hugely different results. No particular run of a model can be expected to reflect the real climate system, in which, also, small changes at one location and time can lead to large differences at other locations and times.[53] Climate modelling generates what one analyst calls 'mutated' facts full of theories, uncertainties and ambiguities – facts that have to be grasped 'as much with your imagination as with your calculator'.[54] That does not make them any less worthy of attention.

So if conventional types of economic management are out the window, what do we do?

A different kind of precaution is needed, one matched to the particular nature of the climate problem.

This kind of precaution would acknowledge and attempt to remove ignorance and uncertainty. It would try to maximise flexibility, resilience and possibilities for future learning. And in the meantime it would avoid irreversible courses of action that are potentially civilisation-threatening.[59]

Unavoidably, that means taking better care of the world's native biota, which constitute a large and volatile storehouse of carbon. But above all, it means slowing and halting fossil fuel extraction pending more research into gaps and blind spots.

'Humanity has become more and more vulnerable to long- and short-term climate change, as it has become ever more difficult and expensive for us to respond to it… The times require us to learn the vagaries of the global climate, to study its moods, and to keep our skies relatively free of excessive greenhouse gases with the same diligence, and for the same reasons, that Mesopotamian farmers five millennia ago had to learn the moods of the Euphrates and keep their irrigation canals reasonably free of silt.'[60]

Brian Fagan, 2004

What? You mean we have to stop mining coal and drilling for oil and gas?

More or less, yes. Remember the image of the above-ground carbon-cycling system – oceans, atmosphere, vegetation, soil – as a giant global waste dump with limited capacity. Then think of fossil fuel mining and burning as a giant factory that's ceaselessly pumping waste into this dump regardless. The only secure way of stopping the dump from overflowing is to reduce drastically, and ultimately stop, the flow into it – to make sure that most remaining fossil fuels stay in the ground.

That seems so extreme.

It's not. Even Sheikh Zaki Yamani, the former Saudi oil minister, has acknowledged that '[t]he Stone Age did not end for lack of stone, and the oil age will end long before the world runs out of oil.'[61] Most fossil fuels are going to have to be left in the ground, just as most of the world's stone is never going to be transformed into arrowheads or Stonehenges.

Continuing to take fossil carbon out of the ground and putting it in the above-ground dump is a one-way street, because it can't safely be put back. Stopping the flow into the dump, on the other hand, is both possible and prudent. Keeping fossil fuels in the ground – and encouraging any democratic movements that already have this objective – has to be the default, mainstream approach to tackling climate change.

How soon must the flow of fossil fuels from the ground to the surface be cut off, then? Immediately? As soon as possible? How soon is that?

There is no single 'correct' answer to questions like that. But some work has already been done on the scale of actions needed to minimise future damage and keep options open.

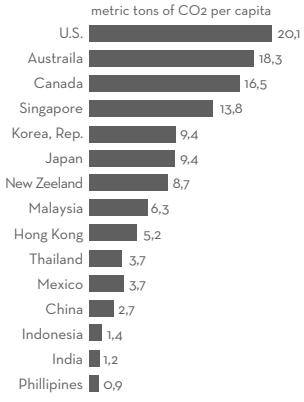
In 2001, the IPCC estimated that restricting temperature rise to 1.5-3.9 degrees Centigrade would require CO_2 levels to be stabilised at 450 parts per million (ppm). That would imply cumulative carbon emissions of only 630–650 million tonnes between 1990 and 2100, compared to the 4,000 million tonnes or so that would result if all remaining accessible fossil fuels were exploited.[62]

In 2005, researcher Malte Meinshausen of the Swiss Federal Institute of Technology found that, on some models, a temperature rise of 2 degrees Centigrade or less – identified rather arbitrarily by many climate experts to be the highest 'safe' level of heating – was likely only if levels of greenhouse gases could be stabilised at 400 ppm of CO_2 equivalent, after peaking at 475 ppm.[63] That would entail a 50 per cent cut in emissions by 2050, with a peak emissions level of no more

than 120 per cent of 1990 levels at around 2010. A rise of 2 degrees Centigrade or less could actually be guaranteed only if atmospheric concentrations stabilised at 350 ppm. That would imply even steeper cuts, since concentrations already stand at 380 ppm.

Quick action is crucial in order to avoid even more painfully drastic action later. Meinshausen warned that annual reduction rates would have to become 1 per cent steeper for every five years of delay. Delaying cuts by 10 years would nearly double the required reduction rate in 2025. Delaying for 20 years, according to researchers Steffen Kalbekken and Nathan Rive, would mean having to reduce emissions three to seven times faster.[64]

Per capita CO_2 emissions 2002: North America and Asia/Pacific



Source: (CDIAC)

But how are these cuts going to be made? And who is going to make them?

These are the questions at the heart of the climate debate. And they are not just questions for experts. By revealing that the world's carbon dump is a very limited good, the science of global warming has revealed a problem that is just as much political as technical.

What do you mean?

The world's carbon-cycling capacity, partly because it's very limited, has also become extremely valuable. For that reason, everybody is going to be interested in getting rights to it (see box, below: The Birth of Atmospheric Rights). Pressures will grow to divide up the global carbon dump among the world's people.

'Delaying action for decades, or even just years, is not a serious option.'

Science, *9 January 2004*

Divide up how?

That's a crucial question, and one that has simmered underneath the surface of international negotiations about climate for many years.

What kind of rights should people or governments have to carbon dump space, given the need to maintain climatic stability for current and future generations? And who will get these rights? Do you divide up the dump space equally among the world's people? Do you give the world's worst-off disproportionate shares in the dump? Do you give the biggest shares to those who haven't yet had a chance to use much of the dump? Do you give the biggest shares to those who can least afford to cut down on their use of the dump? Do you give the most dump space to those who can use it to contribute the most to the global good? Or do you just give the most rights to the dump to those who are using it the most already? There are arguments for all of these ways of distributing the world's carbon-cycling capacity.

'If we are to avoid having to make dramatic and economically destructive decisions in the future, we must act soon.'

Foreign Affairs, *July/August 2004*

The Birth of Atmospheric Rights

Up to now, philosopher Peter Singer writes, it is as if the world's people have been living 'in a village in which everyone puts their wastes down a giant sink'. At first there is no problem:

'No one quite knows what happens to the wastes after they go down the sink, but since they disappear and have no adverse impact on anyone, no one worries about it. Some people consume a lot, and so have a lot of waste, while others, with more limited means, have barely any, but the capacity of the sinks to dispose of our wastes seems so limitless that no one worries about the difference.'[65] No matter how much of the sink one person may use, no problems arise, because there is always enough for everybody else.

But after a while,

'…the sink's capacity to carry away our wastes is used up to the full, and there is already some unpleasant seepage that seems to be the result of the sink's being used too much… When the weather is warm, it smells. A nearby water hole where our children swim now has algae blooms that make it unusable. Several respected figures in the village warn that unless usage of the sink is cut down, all the village water supplies will be polluted.'

Continuing to throw wastes down the sink, in other words, does not leave enough of it for everyone to use without harm to the community.

'What we might have assumed was our *de facto* right to use the sink any way we wanted comes into question. The sink belongs to us all in common. In order to avoid consequences no one wants, everyone who uses it must now accept some limits.' Atmospheric rights, Singer believes, must now be discussed, defined, limited and allocated.[66]

Whew. Sounds complicated.

It is. That's why the second and third chapters of this special report of *Development Dialogue* are reserved partly for a look at how this politics has developed.

OK, I'll wait for that. But right now can't you at least give me some idea of the political status quo? Who has been using the most dump space so far? Who is most responsible for the current climate crisis?

As mentioned at the beginning of this chapter, the North is overwhelmingly responsible. Andrew Simms of the New Economics Foundation perhaps sums up the situation best: 'Economic superpowers have been as successful today in their disproportionate occupation of the atmosphere with carbon emissions as they were in their military occupation of the terrestrial world in colonial times.'[67]

From 1950 to 1986, the US, with less than 5 per cent of the world's population, was responsible for 30 per cent of its cumulative greenhouse

gas emissions. India, with 17 per cent of the world's population, was responsible for less than 2 per cent.[68] In 2000, the US was emitting 20.6 tonnes of carbon dioxide per person, Sweden 6.1, Uruguay 1.6 and Mozambique 0.1.

In fact, it's probably not too far off the mark to say that the US alone is currently using all of the 'available' global dumping space for greenhouse gases. To borrow Peter Singer's words, to continue to act in this way and yet to 'ensure community survival would be to deprive others of any use of it at all.'[69]

In short, industrialised societies are not only using more of the world's carbon dumping space than everybody else; they're also using several times more than is available for the use of all.

That's about the size of it. So any attempt to keep fossil fuels in the ground is going to have to tackle industrialised societies' addiction to fossil fuels and the energy-profligate ways of living they have made possible.

So the days of petrol-fuelled cars, coal-fired electricity generation, and oil-based air travel are limited.

These are all now 'sunset' technologies, to be phased out as soon as possible.

Not an easy challenge.

No, but not an impossible one, either.

Where do you start?

There are plenty of places to start, and many of them will be discussed in this special report. But the important thing to remember now is that in the struggle to stem the flow of fossil carbon out of the ground, no one is beginning from zero.

Most human experience and most human achievement has taken place in societies in which very little oil, gas or coal is used. It is the world's rich minority that has grown most dependent on fossil carbon; and only in relatively recent times. And even their addiction can be broken by social and technological innovations that only require powerful enough political movements to be set in motion.[70]

Nor is it only efficiency experts, community planners and developers of solar or wind energy that are providing the materials to enable greater independence from fossil fuels. Just as important are the many social movements with deep experience in resisting fossil fuel extraction or exploitation.

Global warming, after all, isn't the first fossil fuel crisis. Coal, oil and gas have been associated with environmental degradation, damaged lives, debt,[71] social conflict and war for a long time, resulting in sustained campaigns of opposition.

For decades, exploration for new oil and gas fields has gone hand in hand with encroachment on people's land and with preparations to dispossess them.

Extraction has also provoked creative resistance all over the world, as, from Ecuador to the Russian Far East, from Nigeria to Burma, fossil fuel corporations, usually backed by governments, have stolen or contaminated local land, forests and water while massively increasing the debt of countries they work in.[72]

Refining and transport have brought their own legacy of impairment, disease, dispossession and contamination. And pollution from industrial and power plants burning fossil fuels has left a mark of suffering, disease and conflict on affected communities for over 150 years.

Road built through forest in Ecuador to extract oil (top).

Oil spill in the Ecuadorean forest (bottom).

Not least, the militarised quest of industrialised societies for oil has endangered security, poisoned lives and blighted politics around the world. Today, wars costing countless numbers of lives and billions of dollars can be fought for the sake of a few months' or years' worth of oil, and face opposition movements worldwide.

The struggle to stabilise climate – to stop the world's above-ground carbon dump from overflowing – takes its place as one more aspect of this long history of conflict. And it brings out a lesson encoded in that history: the need to find ways of leaving coal, oil and gas in the ground.

That's not a lesson you often see discussed in the newspapers or on television.

No. In fact, most business and political leaders continue to act as if it's a foregone conclusion that all remaining oil, gas and even coal will have to be taken out of the ground, even as they proclaim the urgency of doing something about global warming (see box: Trying to Have It Both Ways).

Women from coastal communities in Songkhla, southern Thailand, protest against a gas pipeline and separation plant project that threatens local fisheries, common land and livelihoods.

Trying to Have It Both Ways: More Fossil Fuels, Less Climate Change

Most business and political leaders speak as if humanity could survive all remaining fossil fuels being taken out of the ground, yet also claim to be committed to action on climate change.

'There is no environment minister on Earth that will stop this oil from being produced,' said Canadian environment minister Stephane Dion in November 2005,[73] referring to a project to mine and process Albertan tar sands that will double Canada's CO_2 emissions in the course of making available billions of additional barrels of oil.[74] Less than two weeks later, Dion told the delegates to the international climate negotiations gathered in Montreal that 'climate change is the single most important environmental issue facing the world today':

'We know that the longer we wait, the larger will be the challenge and the damage from climate change…more action is required now [in pursuit of] our ultimate common objective of stabilising greenhouse gas concentrations.'[75]

Across the Atlantic, British Prime Minister Tony Blair bullied Members of Parliament into acquiescing in an expansion of Britain's aviation industry, the recipient of a GBP 9 billion annual subsidy in waived fuel taxes: 'Hands up around this table… how many politicians facing a potential election at some point in the not-too-distant future would vote to end cheap air travel?'

Blair, who then went on to ditch a policy to require housebuilders to improve the energy efficiency of homes,[76] and whose 'minimal' support for renewable energy has been 'deplored' even by a committee of the House of Lords,[77] had recently identified climate change as 'probably the single most important issue we face as a global community'[78] and emphasised that 'the time to act is now'.[79] Subsequently, he criticised the international climate change debate for a 'reluctance to face up to reality and the practical action needed to tackle problems'.[80] Blair's aviation policy means that his government's target of cutting carbon emissions by 60 per cent by 2050 could only be achieved if every bit of machinery other than aeroplanes and ships stopped producing any emissions at all.[81]

In the same year, the International Energy Agency (IEA), comprising the 26 main oil-consuming nations, recommended that the global oil industry invest USD 20.3 trillion in new facilities by 2030, to avoid higher oil prices. The IEA then went on to warn that unless the world takes action to reduce energy consumption, global greenhouse gas emissions will increase by 52 per cent by 2030. 'These projected trends lead to a future that is not sustainable… We must change these outcomes and get the planet onto a sustainable energy path,' said William C. Ramsay, the IEA's Deputy Executive Director.[82]

Oil companies such as BP and Shell meanwhile continually boast of increased, not decreased, efforts to find and exploit new sources of fossil fuels. 'My view is that hydrocarbons will be the bulk of the energy supply for the next 30 to 50 years,'[83] said John

Browne, chief executive of BP. Yet Browne, who oversaw a switch of BP's logo to a green and yellow starburst adorned with the slogan 'Beyond Petroleum', proclaims that 'global warming is real and needs to be addressed now'.[84] Ron Oxburgh, head of Shell, conceded in 2004 that climate change made him 'very worried for the planet'.[85]

In a 2005 publication, the World Business Council on Sustainable Development outlines key areas for future action on climate change, including efficiency, nuclear energy, government support for energy research and development, and technology transfer to the South. It neglects to mention any measures for phasing out fossil fuels before they are exhausted.[86]

Finally, the World Bank, which has consistently obeyed the 1981 demand of the US Treasury Department that it play a lead role in the 'expansion and diversification of global energy supplies to enhance security of supplies and reduce OPEC market power over oil prices',[87] scorned the August 2004 recommendation of its own review commission that it halt support for coal extraction projects immediately and phase out support for oil extraction projects by 2008.[88] The commission, chaired by former Indonesian environment minister Emil Salim, had pointed out that such extractive projects did nothing to promote the Bank's stated mission of alleviating global poverty.

From 1992 through late 2004, the World Bank Group approved USD 11 billion in financing for 128 fossil-fuel extraction projects in 45 countries – projects that will ultimately lead to more than 43 billion tonnes of carbon-dioxide emissions, a figure hundreds of times more than the emissions reductions that signatories to the Kyoto Protocol are required to make between 1990 and 2012. Another USD 17 billion has gone for other fossil fuel-related projects. In 2004-2005, the World Bank Group spent USD 7.6 billion in fossil fuel-intensive sectors (37 percent of its total lending for the year) with only marginal efforts to address the climate change implications.[89] More than 82 per cent of World Bank financing for oil extraction has gone to projects that export oil back to wealthy Northern countries. Bank financing for fossil fuels outpaces renewable energy financing by 17 to one.[90] Some of the biggest beneficiaries of Bank funding include Halliburton, the oil contractor, Shell, ChevronTexaco, Total, ExxonMobil, and other fossil fuel companies.[91] Yet in 2005, the Bank was assigned a key role in tackling climate change by the G8 group of economic powers. 'Let's work together for a climate-friendly future,' said Bank president, Paul Wolfowitz, one of the architects of the US war on Iraq.[92]

Gas flaring in Delta State, Nigeria (top) and protests (bottom).

They hope to solve the problem of the overflowing above-ground carbon dump not by cutting off the flow of fossil carbon from underground, but by carving out new dumps to put it in.

Solemnly, they propose parking carbon dioxide in holes in the ground, or liquefying it and injecting it into the bottom of the ocean. In all seriousness, they suggest putting the extra carbon in billions of extra trees specially grown for the purpose. Without any sense of absurdity, they advocate 'compensating' for the extraction of remaining fossil fuels by making extra efforts to 'save' them or use them more efficiently; or by cutting down on the use of other greenhouse gases like hydrofluorocarbons or nitrous oxide; or by building more windmills than had been originally planned; or by burning off the methane that coal mining releases rather than just venting it into the atmosphere.

Political and business leaders then go on to propose a market for exchanging all of these supposedly 'equivalent' things for each other. This is a market, they assure the public, in which you will be able to 'pay' the environmental costs of continuing to drill oil by screwing in efficient light bulbs, or for the costs of opening a new coal mine by burning the methane that seeps up out of the same mine.

The message is clear. Industrialised societies can continue to use up fossil fuels until there are none left worth recovering. Subsidies for exploitation of fossil fuel deposits need not be reduced. Nor is there any need to get started right away on a just technological and cultural transition to a society that does not need coal, oil and gas.

The untenability of this attempt to escape from the climate crisis – and the way it extends those classic conflicts over exploration, extraction, refining, pollution, militarisation, debt and insecurity that have been a feature of society's relationship to coal, oil and gas for more than a century – will be the subject of much of the rest of this special report. The next chapter will sketch how carbon trading developed historically.

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2 Jeffrey S. Dukes, 'Burning Buried Sunshine: Human Consumption of Ancient Solar Energy', *Climatic Change* 61, 2003, pp. 31-44.

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6 Robert L. Hirsch *et al.*, 'Peaking of World Oil Production: Impacts, Mitigation and Risk Assessment', US Department of Energy, Washington, 2005, available at http://www.hubbertpeak.com/us/NETL/OilPeaking.pdf. For another view of the controversy see Jeremy Leggett, 'Half Gone: The Coming Global Energy Crisis, Its Conflation with Global Warming and the Consequences', 2005, http://www.lorax.org/~oilchange/priceofoil.org/media/20051000_l_o_P.pdf.

7 Duncan Austin *et al.*, *op. cit. supra* note 1.

8 United States National Oceanic and Atmospheric Administration, *NOAA Magazine*, 15 July 2004, www.magazine.noaa.gov; Eugene Linden, 'Cloudy with a Chance of Chaos', *Fortune*, 17 January 2006. Putting all remaining fossil carbon into the atmosphere would entail staggering concentrations of several thousand parts per million.

9 'Joint Science Academies' Statement: Global Response to Climate Change', June 2005, http://www.royalsoc.ac.uk/displaypagedoc.asp?id=20742.

10 Naomi Oreskes, 'The Scientific Consensus on Climate Change', *Science* 306, 3 December 2004, p. 1686.

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Chapter 2
'Made in the USA'
A short history of carbon trading

In which the surprising story is told of how corporations, academics, governments, United Nations agencies and environmentalists united around a neoliberal or 'market' approach to climate change emanating from North America.

In the space of a few decades, a new form of global inequality has abruptly become politically important. An industrialised minority has been shown to be overusing the earth's ability to cleanse the atmosphere of excess carbon and other greenhouse gases. Awkwardly, this inequality has turned out to be one that threatens survival itself – including, ultimately, the survival of the rich.

So what's to be done?

By whom? And about what? Different people see the crisis in different ways.

Northern elites face one set of problems. How are they going to defend power and privilege over a global good they never had to compete for before? How are corporations and society going to cope with the new threat to a fossil-fuelled industrial structure? How best might corporations ride the wave of the climate crisis, seeking rewards for innovation and seizing new assets? What effect will different kinds of political action on climate change have on accumulation and inter-regional economic competition? How can the political unrest that's sure to follow on from various climate disasters be either contained or exploited?

Southern elites are concerned about somewhat different questions. How can the climate crisis be prevented from being used as yet another excuse for pushing aside the long-thwarted claims of Southern countries to industrialisation and the world's wealth? How might it be transformed into a source of political leverage? What are the best strategies for dealing with unanticipated catastrophes and enormously increased flows of environmental refugees?

As with every new international development, all sides are eyeing each other cautiously, uncertain how the new conditions will affect their respective standings.

Sounds like a familiar story.

Yes. But if elites' attitudes are predictable, some of the issues are new. Global warming isn't a threat like that of ozone depletion or even nuclear weapons. It can't be fixed without broad social and political change. Its implications for corporations are many-sided, but threatening for the largest energy companies and the energy-intensive private sector generally. Hardest of all, as this report will argue, averting the worst effects of climate chaos is likely to entail democratic mobilisation.

For global elites, particularly in the North, these realisations are inevitably harder to stomach than the threats posed by global warming itself. The science fiction-like spectre of rampant superstorms, collapsing agriculture and drowned coastlines is easily trumped, in the elite imagination, by the more mind-wrenching terrors of less energy use, less centralisation, slower transport, and – most staggering of all – less inequality.

But isn't it also the case that political and business leaders are simply in denial about the urgency of the climate crisis?

Northern environmentalists often like to say so. But as the last chapter has suggested, most elites, with a little help, can quite well imagine what lies in store if greenhouse gas levels continue to rise. What they have difficulty with is accepting political action that is commensurate with the problem.

You mean they know what's happening, but lack the political will to do anything about it.

It's not really a 'lack of political will'. In fact, as this chapter will document, many leaders – and the private corporations and technocracies that channel their choices – have a surplus of 'political will' for dealing with the climate crisis, just as they have plenty of political will for trying to turn any other crisis to their advantage. The problem is that almost all of this 'will' is directed towards technical, informational or 'market' fixes entrusted to a handful of undemocratic institutions.

Technological fixes are tempting.

Thus US president George W. Bush openly proclaims the need for the US to break its addiction to oil – only to propose technological fixes such as sequestration of carbon from coal-fired power plants, biofuels and more nuclear energy.[5] Sir David King, the UK government's chief scientific adviser, warns that climate change is a threat greater than terrorism – only to embrace some of the same technologies, plus emissions trading, as a solution.[6]

What Is International Climate Policy About?

The 1992 Framework Convention on Climate Change 'was not negotiated primarily to reduce greenhouse gas emissions' but rather 'as part of a wider bargain between rich and poor countries, competing energy interests and governments faced with growing economic problems making investments in the future increasingly more essential but also more difficult.'[1]

Sonja Boehmer-Christiansen, 1994

'It is more appropriate to explain the nature of the principal elements in climate policy at both national and international levels if one assumes that what is driving the leading states and firms in this regard is the concern to create new sites of capital accumulation, rather than a focus on aggregate GDP growth and the impacts of climate policies on such growth.'[2]

Karine Matthews and Matthew Paterson, 2005

'Establishing a robust global regime for addressing climate change is… comparable to the creation of the international trade regime under the World Trade Organization.'[3]

Michael Zammit Cutajar,
ex-Executive Secretary
of the United Nations Framework
Convention on Climate Change, 2004

'Acceptance of [the carbon trading provisions of the Kyoto Protocol] represents an article of faith, faith in the free market and faith in the process of globalisation. It rests on an ideological stance.'[4]

Mick Kelly, Climatic Research Unit,
University of East Anglia, 2000

You talk about 'fixes' as if there was something wrong with them. But what's wrong with fixes? Isn't that what we want – to fix the climate crisis?

The problem is that such 'fixes' don't fix. They promise to deliver the world from the worst dangers of climate change while leaving everything else – politics, commerce and so forth – just as it is. But in fact, as the rest of this special report will demonstrate, they do the opposite. They leave the course of climate change just as it is while exacerbating the inequalities that will have to be addressed if the issue is to be touched on at all.

This chapter will introduce this subject by sketching the history of the processes that trapped official international action on climate change within a US-style framework of neoliberal policy. It will suggest that a new enclosure movement has formed around three interlinked strategies, or alternatives, each of which interacts with and often reinforces the others.

The first strategy works to reshape or suppress understanding of the climate problem so that public reaction to it will present less of a political threat to corporations. *The second strategy* appeals to technological fixes as a way of bypassing debate over fossil fuels while helping to spur innovations that can serve as new sources of profit. *The third strategy* appeals to a 'market fix' that secures the property rights of heavy Northern fossil fuel users over the world's carbon-absorbing capacity while creating new opportunities for corporate profit through trade.

The knowledge fix

One constant theme of climate politics over the last 20 years has been the attempt to engineer public reaction to global warming so that it will present fewer political threats to, and more opportunities for, corporations and their political clients. Some corporations, particularly in the US, try to deny that humans are changing the climate at all. Others openly acknowledge the threat while trying to reformulate it in a way that benefits them.

So the big companies are arguing among themselves about global warming?

Yes, but on another level the different sides are working in similar directions. For example, more regressive factions in the oil industry, working public opinion mainly within the US, may promote the view that the climate isn't changing or that it's fruitless to try to do anything about it. Other factions, working worldwide, may argue that there is a scientific basis for action but read the science in a way that helps them steer international agreements toward technological and market fixes that preserve the inertia of fossil fuel-intensive industries. The broader outcome is the same: entrenchment of corporate power over carbon dumps.

It sounds like the good cop – bad cop technique of police interrogation. It's as if, like the proverbial bad cop, industry activists within the US go straight for the throat of any international agreement on climate change – while, like the good cop, their colleagues outside the US 'defend' such agreements, hoping to cajole and squeeze them into giving them what they want. Have the people who deny that humans are causing the climate to change gone as far as the pro-tobacco lobby used to go in rejecting the evidence?

There are certainly some parallels with previous cases of suppression of scientific evidence, but the antagonists in the climate debate are more numerous and the issues more complicated.

The health effects of tobacco (some of which were noticed as early as 1602),[7] were confirmed through extensive research in the 20th

century, but it was not until 1970 that the Surgeon General's health warning had to be displayed on every cigarette pack sold in the US.

Discussion of climate change science follows a somewhat similar – but much more complex and twisting – trajectory. Although the first explanation of how carbon dioxide can act as a greenhouse gas is usually attributed to the great Swedish scientist Svante Arrhenius in 1896,[8] the 'greenhouse earth' analogy was used as early as 1827 by the French polymath Jean-Baptiste Fourier[9] and the term itself mentioned by US scientist Thomas Chamberlin in 1906.[10] In the 1950s, a regular rise in levels of carbon dioxide in the atmosphere began to be documented, and in the 1970s a series of studies by the US Department of Energy increased concern about possible global warming. In 1975, scientists still weren't sure whether the earth was warming or cooling, but 10 years later, at the first major international conference on the greenhouse effect at Villach, Austria, climatologists warned of a 'rise of global mean temperature which is greater than any in man's history' in the first half of the 21st century and up to a one-metre rise in sea levels.

At that point, with the help of funding-hungry research bodies, an alarmed US government moved energetically, in the words of one observer, to put climate scientists 'back in their cages'.[11]

How?

It worked to shift the centre of gravity of engaged scientific inquiry into climate change from independent academics and the United Nations Environmental Programme to technical bureaucracies more closely tied to governments. These included the World Meteorological Organisation and the Intergovernmental Panel on Climate Change (IPCC), which was formed in 1988.[12]

The scientific debate over society's effects on the climate has some similarities with past debates over tobacco's health effects.

How did that help the US?

The Northern-dominated science bureaucracy that resulted was 'increasingly dependent on multinational research funding'[13] and was subject to a great deal of US influence, with many US officials assigned to comment on every draft report produced.[14]

Designated the task of providing governments and diplomats with authoritative but standardised story lines describing climate change, the IPCC naturally tended to homogenise contrasting views and downplay controversy. Under pressure from policy makers to say exactly how bad things might get, it also got into the dubious habit of reformulating indeterminacies and ignorance as 'uncertainties' or mere 'risks' or 'probabilities'.[15] This stance was useful in giving some policy makers the numbers they wanted and attracting more research funding, but it also encouraged the notion that governments and corporations could delay action until more 'definitive' results were in.

Under pressure from policy makers to say exactly how bad things might get, some scientists got into the dubious habit of reformulating indeterminacies and ignorance as 'probabilities'.

That's hardly evidence that the IPCC was under the thumb of the US government.

It wasn't. It's important not to oversimplify. But there has always been a sense in which the IPCC has helped shape climate problems and solutions in ways that make them more acceptable to powerful governments and corporations. A more concrete example might be the IPCC's response to diplomats' request to look into the possibility of storing carbon in trees and soil as a way of compensating for carbon dioxide emissions.

I suppose you're going to say that the IPCC was under a lot of pressure to give its stamp of approval to the idea of trading trees for smoke, because that's what Northern countries needed in order to continue using fossil fuels.

Well, it's certainly true that by 2000, when the IPCC submitted its 377-page report on *Land Use, Land Use Change and Forestry*,[16] countries such as the US, Japan, Canada, Australia, New Zealand and Norway had been pressing hard for some time to be allowed to count huge amounts of the carbon soaked up by their forested land against their industrial emissions. Many Northern countries were also keen on being allowed to buy pollution rights from carbon-absorbing forestry projects abroad.

So perhaps it shouldn't be a complete surprise that the IPCC's report provided the US and its allies with just the conclusions they needed. The problem was that the report had to abandon normal standards of technical rigour in order to do so.

What do you mean?

Defying a warning from the International Institute for Applied Systems Analysis that the IPCC's work to date 'could not be considered adequate in handling the uncertainties underlying the carbon-accounting problem and thus the Kyoto Protocol',[17] the authors assumed without evidence that 'removals by sinks' could verifiably compensate for 'emissions by sources'. According to one author, the land use panel 'never considered' whether the necessary carbon accounting procedures were actually possible or not (see Chapter 3). After the report came out, one businessman panel member proclaimed that there were 'no technical problems left' with the idea of trading emissions for trees.[18]

It quickly emerged that the panel had brought little of the available knowledge relevant to forest carbon accounting to bear on its deliberations. Thousands of relevant peer-reviewed references were missing – on deforestation, the history of forestry development projects, peasant resistance, forest commons regimes, investor behaviour, and so on. While the panel observed that it is 'very difficult, if not impossible' to distinguish changes in biotic carbon stocks that are 'directly human-induced' from those that are 'caused by indirect and natural factors',[19] it failed to draw the logical conclusion that it would be very difficult, if not impossible, for countries to claim credit for changes in forests and soils.[20] Ironically, it fell to non-scientist UN delegates from Southern countries such as Uganda, Kenya, Tanzania and Guatemala to raise scientific questions that the expert panel had neglected, about forest data, opportunity costs of carbon forestry, accounting for effects on fossil fuel use, discount rates, and so forth.

Are you suggesting that somebody bribed the whole panel to come up with the 'politically correct' response?

No, of course not.

Are you saying that this panel of dozens of reputable experts and businesspeople was somehow incompetent?

Not at all. Their technical qualifications were often impressive.

You mean that someone intimidated them, then?

Nothing so crude. The ways influence works are usually more subtle and more powerful. Most of the authors of the report were affiliated with environmental consultancies, mainstream forestry or economics institutes or faculties, industry associations, official agencies and government-funded research institutions. Many saw carbon 'offset'

research as a promising enterprise for their institutions. Three-quarters hailed from the North, and even more worked at Northern institutions. Over half of the authors and editors of the chapter examining the technical possibility of countries' claiming carbon credit for 'additional land and forest activities' within their borders were from the US, Canada or Australia – the three countries most active in demanding credit for wooded land.[21]

At the same time, the panel included no representatives of indigenous peoples who live in or depend on forests, or of communities directly affected by plantation projects. It included no representatives of communities damaged by fossil-fuel pollution that would be licensed by 'forestry offset' projects, who also would have had incentives to insist on better science. To the middle-class natural scientists and economists who dominated the panel, it was likely to be simply a given that there were vast 'degraded lands' in the South (but not the North) that could be taken over for carbon projects without land or forests being degraded elsewhere as a result; that project development agencies could do what they promised; and that it would be easy to determine from a distant office whether projects actually 'saved' carbon. The panel's membership was largely mismatched with the problem it investigated.

So you're saying that official climate-mitigation science is contaminated with politics?

No. To say the science is 'contaminated' would imply that it's an abnormal situation for science to be enabled, constrained and motivated by politics.

But it's not abnormal. It's unavoidable. No world can exist in which policy can be 'science-led' without science being 'policy-led' at the same time. Nor would such a world be desirable. Nor would it be desirable to live in a world in which people believed such a world was possible or desirable.

What are you suggesting?

Just that it would be constructive for scientists and policy makers to face the reality that 'modern science both constitutes and is constituted by particular forms of politics', as Sheila Jasanoff, Professor of Science and Public Policy at Harvard, puts it.[22] It would be helpful for everyone simply to admit that both the answers scientists give and the questions they ask and the way they work are influenced by funding, by policy makers' and journalists' questions, by market ideologies, by cultural background, by friends, by schooling and all the rest.

Why would that be helpful?

Acknowledging and examining these lines of influence – rather than claiming that 'good science' is somehow immune from them – would give all sides incentives to be more aware of what kind of politics is involved in any particular research scheme, and what the consequences are. It could help refocus public attention on the importance of working to create an environment in which there can be scientific communities that ask interesting and varied questions of concern to a wide range of interests in a democratic society, and are not pushed too hard into trying to provide impossible escape routes for narrow elites or inveigled into dead-end research programmes, damaging mistakes and acts of self-deception. Such communities would be able to work among a group of peers who would allow and encourage them to question received wisdom, to make trouble for neoliberal doctrine when the scientific need arises, and to have the choice not to answer every policy maker's or journalist's demand with an oversimplification.

But what would make that possible?

Claiming to be able to conjure up an 'objective' science outside any social context isn't an option.

Probably the only way to make a space for a science less restrained by neoliberalism is to work against the dominance of neoliberalism in the wider society. Finessing the problem by claiming to be able to conjure up an 'objective' science outside any social context isn't an option. As science scholar Simon Shackley and colleagues observe, scientists may as well accept politicisation of climate science 'as a given and find ways to cope constructively with such a political reality'.[23]

In another example of the interpenetration of politics and climate inquiry, prodding from the US and 'well-organized social science research interests' resulted in orthodox economists capturing much of the agenda of the IPCC's Working Group III, charged with defining possible responses to global warming.[24] The historical and social roots of climate change were ignored, as were grassroots resources for tackling climate change. Instead, technocrats forecast energy use, modelled the future global economy, collected socioeconomic data needed for management 'solutions' and toyed with the idea of using cost-benefit analysis to help make decisions about climate change. On the whole, the tendency was to try to fuse 'formal mechanistic models across the various distinct natural and social science disciplines'[25] and to 'treat society as a single species'.[26]

The bad (social) science that resulted should not be blamed on bias – even the best-researched and best-defended results would have been biased – but on the narrowness and less than democratic nature of

the political process that guided and constituted the research. Correspondingly, insofar as the bad science that came out of Working Group III was challenged at all, it was countered most effectively by a political movement that put that narrow process in perspective, not a demand from within the profession of orthodox economics for greater 'objectivity'.

How was the challenge made?

In 1995, economists in Working Group III, using data on how much money different groups spent to avoid risk of death, calculated the value of a statistical life of a US citizen at USD 1.5 million and that of a statistical life of a 'developing country' citizen at USD 100,000. The economists used these calculations to suggest that climate change would cause twice as much 'socio-economic' damage to the industrialised countries as to the rest of the world. The figures touched off a furore among Southern delegations to the UNFCCC, who contested this interpretation of their countries' citizens' appreciation for safety. The calculations were sent back to their authors.[27]

Despite such setbacks, much of the IPCC's work had the effect of making climate change seem potentially manageable by private and public sector institutions including oil companies and the World Bank, and by means of neoliberal approaches generally. It became 'politically incorrect' to enquire whether radical social change might be necessary to reduce greenhouse gas concentrations to a safer level. What was needed, it was implied, was to unleash the productive powers of private sector companies in the service of climatic stability. For corporations, this was the positive, opportunity-creating aspect of the 'knowledge fix'.

But the story is far from one-sided. Viewed from another angle, the establishment of the IPCC was itself an admission of the difficulty of reconciling the climate problem with business as usual. And the very constraints inherent in having to pursue a highly centralised, self-censoring, compromise science meant that results indicating the reality of climate change – when they did come in from bodies such as the IPCC – were hard for the US and many large corporations to handle.

So this particular US attempt to block or shape public awareness of climate change was double-edged.

Very much so. It backfired so badly, in fact, that in the end various ruling factions in the US became dissatisfied with the very body – the IPCC – that the US had been so influential in setting up in order to

'contain' scientists' talk. Even Robert T. Watson, the World Bank scientist-bureaucrat who as head of the IPCC had often worked hard to accommodate scientific findings to US and World Bank sensibilities,[28] attracted the wrath of ExxonMobil and was voted out of his position in 2002.[29]

But didn't US corporate interests have ways of influencing climate science other than through the IPCC?

Of course. US companies and their political supporters would never have dreamed of relying on only one set of institutions to contain the domestic political threats implied by climate change.

Corporate or corporate-backed groups such as the Business Roundtable, the Global Climate Information Project, the Coalition for Vehicle Choice, the National Centre for Public Policy Research, the Advancement of Sound Science Coalition and the Information Council for the Environment spent millions of dollars on experts, conferences, books and advertisements associating climate action with economic harm to the US, including higher petrol prices.[30] The US Electric Power Research Institute, which is funded by electric utilities, financially supported 'seven of the major authors of integrated assessment studies' as well as co-sponsoring a special issue of *The Energy Journal* on the costs of the Kyoto Protocol, provoking the editors of the academic journal *Climatic Change* to protest that the 'nature of funding of most leading economic models' of climate change was 'a source of concern'.[31] Non-government organisations such as the Pew Centre for Climate Change and establishment think-tanks such as the Council on Foreign Relations, aided by the faculties of many North American and British economics departments, also helped carry the message to news media that Kyoto targets were 'unrealistic'.[32]

Aligned with a somewhat different set of corporate interests, the Global Climate Coalition meanwhile aimed a multimillion-dollar disinformation campaign at US audiences attacking the whole idea that the climate was changing, including a USD 13 million pre-Kyoto Protocol advertising blitz in 1997 alone.[33] Business coalitions and corporate-funded think-tanks have also sought out and supported climate-sceptic scientists in order to disseminate their views in an attempt to ensure that the idea of human-caused climate change remains 'controversial'.[34]

These are the famous climate change 'deniers' we always hear about?

Yes.

Are they really still around?

Well, these days they're fighting a bit of a rearguard battle. And there were never many of them in the first place. Still, as late as May 2006, the right-wing Competitive Enterprise Institute was laying out hundreds of thousands of dollars for a US television advertising campaign attacking 'global warming alarmism' as an attempt to 'suppress energy use' based on dubious science.[35] As before, such efforts are targeted mainly at the US public.[36] But they also remain visible elsewhere.[37]

Still, it's in the US that the influence of the global warming sceptics really counts.

Yes. What with the dependence of US elected officials on corporate finance, extreme and often bizarre views about climate change that would not be heard elsewhere in the world have endlessly reverberated in the echo chamber of Congress as well as on US television news programmes. Also, while many US scientists do continue to be outspoken about the biophysical dangers of climate change and the global inequalities that underlie the overloading of the atmosphere with fossil carbon, they are seldom able to draw conclusions from these views in a way that challenges conventional economic development ideology and its corporation-first pieties. All too often, they follow warnings about the need for drastic action on climate change with claims (for instance) that more nuclear energy or tree plantations are needed, or that 'we should not have a strategy that results in premature retirement of capital stock'.[38]

The same institutionalised weakness of imagination is reproduced in US universities, schools, newspapers and popular entertainment. The global warming movie *The Day after Tomorrow*, for instance, has plenty of scenes of New York streets awash in an icy Atlantic ocean, but, just as in UN negotiations, the words 'oil' and 'corporation' are not mentioned. The crisis the film is about, it is implied, can be traced mainly to the failure of political leaders to 'listen to scientists'. Aside from the slightly cheeky suggestion that Mexico might soon be faced with a tide of middle-class environmental refugees from the US, the movie's main contribution toward stimulating its viewers' political imaginations is to declare itself 'carbon-neutral' – a marketing strategy whose pointlessness will be explored later in this report. Former US vice-president Al Gore's documentary *An Inconvenient Truth*, released two years later, presents more climatology, but also winds up trying to channel action into carbon trading, responsible consumerism, tree plantations and other 'fixes'. Meditating on Hollywood disaster movies, literary critic Fredric Jameson once observed: 'It seems to be easier for us today to imagine the thoroughgoing deterioration

of the earth and of nature than the breakdown of late capitalism.'[39] It's no surprise, in an age when Hollywood scriptwriters are advising the Pentagon on terror scenarios[40] and pulp novelist Michael Crichton appears as an expert witness on climate change before a US Senate committee,[41] that such attitudes are reflected back into politics.

Where imagination is most lacking in such environments is in the realm not of climatology but of politics. An unhealthy mixture of biophysical horror stories, scepticism, fatalism and vague calls for 'action' is all too easily answered with sophisticated versions of 'business as usual'.

The technological fix

A second strategy for containing climate change and the present and future political threats it implies – as well as for using the climate crisis to open up new opportunities for corporations – is to appeal to technological fixes that allow continued exploitation of coal, oil and gas. Once again, the US has always played a central role.

What are these fixes?

An unhealthy mixture of biophysical horror stories, scepticism, fatalism and vague calls for 'action' is all too easily answered with sophisticated versions of 'business as usual'.

From the 1970s to the 1990s, scientists such as Freeman Dyson and Norman Myers and economists such as Roger Sedjo proposed country-sized tree plantations (usually conveniently sited in the South) as ways of soaking up industrial carbon dioxide.[42] Genetic modification has recently been added to this techno-fix: trees are now being deliberately engineered to absorb more carbon from the atmosphere.[43]

Giant plantations were not the only place US elites hoped to stash the carbon released by the burning of fossil fuels. By 2000, one US Energy Department laboratory was laying plans to spend over USD 900 million over the next 15 years on such schemes as dosing soil with coal combustion by-products to increase carbon uptake, injecting carbon dioxide into deep ocean waters off the coast of Hawaii, and burying carbon dioxide hydrates under Monterey Bay.[44]

Other US-inspired projects have included seeding large areas of land with organisms genetically engineered to fix carbon 'more efficiently'; establishing floating kelp farms thousands of square kilometres in size which, growing heavier as they consumed carbon dioxide, would eventually sink to the ocean floor; and using fleets of C-130 military transport planes to bomb Scotland and other countries with millions of metal cones containing pine saplings.[45] In 2001, the Los Alamos National Laboratory in New Mexico proposed constructing a collection of calcium hydroxide ponds covering an area of 200,000 square kilometres to scrub fossil fuel-produced carbon dioxide from the air.[46]

Good grief!

It doesn't end there. US and Canadian research institutions have also recently seeded various areas of the Pacific Ocean with iron particles to try to stimulate CO_2-absorbing plankton blooms.[47] With financial support from the US Department of Energy, human genome pioneer Craig Venter is now committed to creating a new life form – a synthetic construct based on simple micro-organisms – to clean up carbon dioxide or other greenhouse gases.[48]

Scientists convened by the White House under George W. Bush have meanwhile proposed fleets of ocean-going turbines to throw up salt spray into clouds to improve their reflectivity.[49] And the US National Science Foundation is discussing the possibility of creating a biological film over the ocean's surface to divert hurricanes.[50] In January 2006, a 'weather-modification' bill (S517) was 'fast-tracked' by the US Senate and House of Representatives. The Bill was expected to become law before the 2006 hurricane season.[51]

US scientists have also long contemplated spraying the stratosphere with fine metallic particles to reflect sunlight, perhaps using the engines of commercial jets for the job.[52] Taking unilateral action to dim the sky in this way, explained the late Edward Teller, the father of the hydrogen bomb, is a simpler, cheaper alternative to 'international consensus on …large-scale reductions in fossil fuel-based energy production'.[53]

These schemes sound crazy! Who knows what might happen if they were carried out? Shouldn't scientists and technologists be encouraged to use their ingenuity in ways that would help end dependence on fossil fuels instead?

Perhaps they should, but they would need more institutional, financial and cultural support to do so. Today, as Teller implied, the focus is on avoiding 'large-scale reductions' in fossil fuel use.

Supporting more use of fossil fuels certainly seems to be a big priority at, for example, the US Department of Energy and its old national nuclear weapons laboratories, which have teamed up with oil companies such as Chevron, Texaco, Shell, and BP to study geological sequestration of carbon dioxide. It's also a priority at top universities, due to floods of government and corporate funding directed at the same objective. In 2000, for instance, BP and Ford contributed USD 20 million to Princeton's Carbon Mitigation Initiative, the largest corporate contribution in the university's history. Headed by professors from two departments – mechanical and aerospace engineering, and ecology and evolutionary biology – the scheme tried to find ways to collect carbon dioxide at central processing sources, then store it deep underground. One ostensible objective was to help India and

China 'spend fossil fuels…without doing what we've done to the atmosphere'.[54]

With the help of on-the-ground corporate experiments in Norway and Algeria, the initiative helped disseminate this little-tested and hazardous techno-fix[55] into mainstream discourse. A *Scientific American* article entitled 'Can We Bury Global Warming?'[56] appeared in 2005, along with a parlour game for industry, academic and NGO audiences that conveys the message that carbon capture and sequestration, biofuels, tree plantations and nuclear power can all be reasonably placed alongside energy efficiency and solar energy as components of a climate action portfolio.[57] By 2004, Ron Oxburgh, non-executive chairman of Shell, was on record saying that 'if we don't have sequestration I see very little hope for the world'.[58]

Not to be outdone, Exxon-Mobil, General Electric, Schlumberger Technology and Toyota agreed in 2002 to funnel USD 225 million to Stanford University for a Global Climate and Energy Project assigned to investigate carbon capture and sequestration, production of hydrogen from fossil fuels, biomass energy, and other fields on a list set out in the contract with the four corporations.[59]

The market fix

The third strategy for containing the political threats implied by climate change – while at the same time using it to create new opportunities for corporate profit – is the 'market fix'.

The market fix began to take shape in the late 1980s and early 1990s. Public pressure was growing for governments to agree to do something about global warming. Some of the changes needed had been obvious since the 1970s.[60] These included long-term shifts in the structure of Northern industrial, transport and household energy use away from wasteful expenditure of fossil fuels toward frugal use of solar and other renewable sources. Tackling the problem internationally meant addressing the institutions and power imbalances that had resulted in both the overuse and the globally unequal use of the earth's carbon-absorbing capacity.

That sort of action would have been hard for corporations, governments and UN agencies to accept unless they were under a lot of public pressure to do so.

Yes. It also required a historical and political perspective unfamiliar to many climate scientists and technocrats. It was easier to view global warming's causes in simple physical terms – 'too much greenhouse gas' – without looking too carefully at what would have to be done

to tackle the problem. The priority became to set some targets while leaving the 'how' of long-term structural change for later.

Many international negotiators and their advisers were encouraged to take this approach by the precedent of the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer.[61] The Montreal agreement had been a technocrat's dream. Spearheaded by Northern scientific bureaucracies and governments, it had never had to scrutinise the industrial system as a whole.[62] The ozone problem was presented as nothing more than 'flights of inanimate particles from activities deemed benign in themselves, and not the lifestyles of the rich and famous', to quote the wry assessment of Harvard's Sheila Jasanoff.[63]

But the treaty worked. Unlike global warming, the ozone problem didn't require long-term restructuring of energy sectors central to industrialised economies.[64] Only a few factories were involved. It was relatively easy to set a target and find substitutes for some ozone-depleting substances or phase them out. With the eventual backing of industry itself and the help of a few transition-aiding payments to Southern nations, nearly all nations wound up complying with the agreement.

A tempting model.

Yes. Many climate negotiators thought a similar idea might work with global warming.[65] They were even guided by some of the same scientist-bureaucrats. Targets and timetables for reducing emissions became the big issue. Few questions were asked about power, property, and path-dependence.

Into this vacuum rushed the idea that the technical means of achieving reductions could best be left to the private sector and 'technology transfer'. And if corporations were going to be the stars of the show, why not make it as cheap and profitable as possible for them to meet whatever targets had been set?

And this was the market fix?

Yes. The earth's carbon dump would gradually be made economically scarce through limits on its use imposed by states. Tradeable legal rights to it would be created and distributed to the biggest emitters. Bargaining would generate a price that would reflect the value society (that is, governments) placed on carbon dump use. Emitters who found ways of using the dump more efficiently could profit by selling their unused rights to more backward producers. They could also develop new dumps. The market would 'help society find and move along the least-cost pollution reduction supply curve'[66] (see box on next page, 'What is Carbon Trading?').

What is Carbon Trading?

There are two kinds of carbon trading. The first is *emissions trading*. The second is *trading in project-based credits*. Often the two categories are put together in *hybrid trading systems*.

Emissions trading

Suppose you have two companies, A and B. Each emits 100,000 tonnes of carbon dioxide a year.

The government wants to cut their emissions by 5 per cent. It gives each company rights, or 'allowances', to emit 95,000 tonnes this year. Each company must either reduce its emissions by 5,000 tonnes or buy 5,000 tonnes of allowances from someone else.

The market price for these allowances is USD 10 per tonne. Company A can reduce its emissions for half this cost per tonne. So it's reasonable for it to cut its emissions by 10,000 tonnes: if it sells the extra 5,000 tonnes (for USD 50,000) it will be able to recover its entire expenditure. So the company saves USD 25,000.

For company B, making reductions is more expensive. Cutting each tonne of emissions costs it USD 15. So it decides not to reduce its emissions, but instead to buy the 5,000 tonnes of surplus allowances that company A is offering. If company B reduced its own emissions, it would cost USD 75,000. But if it buys company A's surplus allowances, the cost is only USD 50,000. So company B also saves USD 25,000 on the deal.

Both firms, in short, save USD 25,000 over what they would have had to spend without trading. If they are the only two companies in the country, this means the country's business sector winds up cutting emissions just as much as it would have under ordinary regulation. But by distributing the reductions over the country's entire private sector, it costs the sector as a whole USD 50,000 less to do so.

Some emissions trading schemes allow companies to save any surplus allowances they have for their own use in future years, rather than selling them.

Emissions trading is also sometimes called 'cap-and-trade'.

Trading in project-based credits

Suppose you have the same two companies, A and B, each emitting 100,000 tonnes of carbon dioxide a year. Again, the government wants to cut their emissions by 5 per cent, so it gives each company allowances to emit only 95,000 tonnes.

But now the government tells each company that if it doesn't want to cut its emissions by 5,000 tonnes each, it has another option. It can invest abroad in projects that 'reduce' emissions of carbon dioxide 5,000 tonnes 'below what would have happened otherwise'. Such projects might include growing crops to produce biofuels that can be used instead of oil; installing machinery at a chemical factory to destroy greenhouse gases; burning methane seeping out of a coal mine or waste dump so that it doesn't escape to the atmosphere; or building a windpower generator. The price of credits from such projects is only USD 4 per tonne, due to low labour costs, a plethora of 'dirty' factories, and government and World Bank subsidies covering part of the costs of building the projects and calculating how much carbon dioxide equivalent they save.

In this situation, it makes sense for both company A and company B to buy credits from abroad rather than make reductions themselves. Company A saves USD 5,000 by buying credits from projects abroad rather than cutting its own emissions. Company B meanwhile saves USD 55,000. The total saving for the domestic private sector is USD 60,000.

Other names for project-based credit trading include 'baseline-and-credit' trading and 'offset' trading.

Hybrid trading systems

Some pollution trading systems use emissions trading only. *Hybrid* systems use both emissions trading and 'offset' trading, and try to make 'allowances' exchangeable for project-based 'credits'.

The US sulphur dioxide market uses emissions trading only. But both the Kyoto Protocol and the EU Emissions Trading System mix 'cap-and-trade' allowances and project-based credits, and try to make them mutually exchangeable.

Such systems are enormously complex. Not only is it difficult to try to create credible 'credits' and make them equivalent to 'allowances'. Mixing the two also changes the economics.

For example, imagine that company A and company B above are allowed three options in any combination: cutting their own emissions, trading allowances with each other, or buying credits from abroad.

For company B, the best option would be, again, to buy USD 20,000 worth of credits abroad rather than spend USD 75,000 to reduce its own emissions.

For company A, the best option would be to cut its own emissions by 10,000 tonnes – but only if it could find a buyer who would pay USD 10 per tonne for the 5,000 allowances it would have to spare. Instead of having to pay USD 20,000 for carbon credits from abroad, it wouldn't have to spend anything.

Unfortunately for company A, it can't find any such buyer. If company B can save USD 5,000 by going abroad for credits, it won't buy company A's spare allowances. But company B is the only other firm in the emissions trading scheme. So without company B as a buyer, it's not worthwhile for company A to make any cuts at all, and it too will wind up buying credits overseas.

As Michael Zammit Cutajar, the former executive secretary of the UNFCCC, has stressed, this approach was 'made in the USA'.[67] The pollution-trading mechanisms that formed the core of the Kyoto Protocol were of a type proposed by North American economists in the 1960s;[68] put into practice in US markets for lead, nitrogen oxides and sulphur dioxide and other pollutants beginning in the 1970s and 1980s;[69] and successfully pressed on the UN by the US government, advised by US economists, US NGOs and US business, in the 1990s.[70]

What is the Kyoto Protocol exactly?

The Protocol was adopted in 1997 at one of the annual conferences of the parties to the 1992 United Nations Framework Convention on

Climate Change (UNFCCC). The treaty finally came into force on 16 February 2005, having been ratified by 127 countries responsible for 61 per cent of global greenhouse-gas emissions.

The Protocol binds 38 industrialised nations to reducing their emissions an average of 5.2 per cent below 1990 levels by 2008-2012.

But there are loopholes. Countries unable or unwilling to achieve these modest targets are allowed to 'compensate' for their failure through three trading mechanisms, or markets.

Which are?

First, they are allowed to buy emissions rights from countries that have permits to spare. Countries that were able to win very lax targets to begin with, such as Russia and the Ukraine, are likely to have plenty of permits with which to supply this market.

And second?

Second, industrialised countries can also escape the need to reduce emissions by putting money into carbon-absorbing forestry or soil conservation.[71]

And third?

Last, and most important, the industrialised North can escape its obligations to reduce at home by investing in special, UN-approved 'greenhouse gas-saving' projects abroad.

What are these foreign-based projects?

They fall into two categories. Clean Development Mechanism (CDM) projects are carried out in the South, in countries not subject to the emissions 'cap' on industrialised nations.

Joint Implementation (JI) projects are similar, but are set up in other industrialised countries, in practice mostly in Eastern Europe.

Such trading mechanisms had been tried out nowhere in the world outside of the US. By and large, they had failed even there (see Chapter 3). But support for them from the Bill Clinton regime set in motion a politics that eventually prevailed over both European and Southern opposition[72] (see box on page 52, 'International Climate Politics: Some Recent Highlights'). As climate expert Michael Grubb notes, the 'dominance of US power, and the continuing weakness of foreign policy… elsewhere' has ensured that the negotiations following the Kyoto Protocol – as well as the Protocol itself – have been 'very much as sought by the US administration'.[73]

Also significant was support from some Northern corporations, who were happier with schemes that gave big polluters free property rights in previously 'open access' global dumps than with programmes focused on taxation and more conventional forms of regulation. Traders and bankers hoped to set up new carbon exchanges in London, Chicago, Sydney, Amsterdam, Leipzig and elsewhere. Environmental groups, too, threw in their lot with the market fix on the theory that it was the only way to get a climate treaty approved.[74]

By the time the second George Bush pulled out of Kyoto in 2001 (much to the consternation of US companies hoping to profit from carbon trading, such as Enron), the approach had become internationally entrenched even though its original political rationale had vanished. Its environmentalist backers, many of whom had by now spent much of their careers in the negotiations, were left in the odd position of having to champion an agreement written largely by the US for US purposes on the basis of US experience and US economic thinking, but which no longer had US support.

But the anomaly was quickly forgotten. Journalists and environmentalists alike soon came to treat any criticism of the Kyoto Protocol not as directed against US-style 'free market' environmentalism but, ironically, as playing into the hands of US oil interests and as endorsing a do-nothing position. A little-tested idea spearheaded by a small US elite was now perceived as a global consensus and the 'only show in town'.[75]

Why was US pressure to turn the Kyoto Protocol into a set of market mechanisms so successful?

There's no simple answer. Almost certainly, many factors were involved.

First, there is sheer force of numbers. In the 2000 UNFCCC climate negotiations in The Hague, to take one example, the US fielded 150 well-equipped delegates, housing them in a luxury hotel and sending well-rested and well-briefed representatives to every working group meeting, while Mozambique had to put up its three harried delegates in a noisy youth hostel occupied largely by Chinese tourists.[76] During complex negotiations featuring many simultaneous sessions and drafts of hundreds of crucial documents flying around for continuous comment and revision, such numerical superiority can be decisive.

The US was also able to impose a language on the climate talks in which objections to neoliberal policies could not be effectively made.[77] As IPCC member Wolfgang Sachs notes, orthodox economics and public policy methodology prevented the question even being

raised as to what type of changes would be necessary to reduce greenhouse gas concentrations to a safer level or allocate atmospheric rights equitably.[78] Officials of most countries had neither the background nor the staff to work out in time how to counter, or even to understand, a complicated pollution-trading policy jargon essentially 'made in the USA'.

In addition, the structure of the climate negotiations was itself biased in favour of US interests. As scholar Joyeeta Gupta notes, standard UN negotiating techniques such as 'avoiding polarisation', 'incrementally building on agreement', and pretending to be guided by international legal norms handicap activist Southern diplomats by automatically relegating talk of structural change to the category of the 'merely rhetorical' or 'irrelevant'.[79] Privately, too, negotiators also often speak of US trade threats, bribes and 'dirty tricks', although diplomats and other officials who are successfully targeted often want to keep the news off the record as much as the US itself does.

One example of US influence in the negotiations comes from the Kyoto Protocol talks themselves. In 1997 Brazil proposed a 'Clean Development Fund' that would use penalties paid by industrialised countries that had exceeded their emissions targets to finance 'no regrets' clean energy initiatives in the South.

The gist of Brazil's proposal was accepted by the G-77 nations and China. During a few days of intense negotiations, however, the fund was transformed into a trading mechanism allowing industrialised countries to buy rights to pollute from countries with no emissions limits. Fines were transformed into prices; a judicial system was transformed into a market.

How?

Smaller negotiating groups assigned to discuss channelling penalties for Northern failure to meet emissions targets to a fund for the South were dominated by Northern delegates who wanted to dodge the issue of penalties as much as possible. The 'direct link between compliance and the fund dissolved'[80] and the negotiations turned into a gruelling series of sessions on how to convert the clean development fund into a version of a trading scheme the US had already been backing against the opposition of most of the G-77/China and the EU.

The Clean Development Mechanism that resulted now occupies an immense slice of UN time and involves billion-dollar money flows despite the fact that its effect on the climate may well be negative (see Chapters 3 and 4).

International Climate Politics: Some Recent Highlights

1990: In the wake of warnings from scientists, international support grows for requiring countries to reduce their greenhouse gas emissions to mitigate global warming. The US is opposed.

1991: The UN Conference on Trade and Development sets up a department on greenhouse gas emissions trading.

1992: The Rio de Janeiro Earth Summit produces the United Nations Framework Convention on Climate Change (UNFCCC) to prevent 'dangerous anthropogenic interference with the Earth's climate system'. The UNFCCC suggests, but does not require, that emissions in 2000 not exceed 1990 levels.

1994: The UNFCCC enters into force, signed by 153 countries. The Alliance of Small Island States, in an attempt to hold sea-level rise to 20 centimetres, demands that emissions be cut to 80 per cent of current levels by 2005. The US and its allies reject the idea of cuts, saying that it would be cheaper for them to be allowed to buy permits to pollute in an emissions market. Most EU nations, believing they already have cost-effective means for domestic reductions, portray the US proposal as an attempt to shirk responsibility.

1996: US proposals to avoid reductions by buying permits from abroad and borrowing against future emissions continue to be condemned by the EU, G-77 nations and most NGOs.

1997: The Kyoto Protocol is adopted, binding industrialised countries to limit emissions to approximately 95 per cent of 1990 levels by 2008–2012. But Northern pressure, especially from the US, opens loopholes that allow the target to be met partly by global trading in emissions allowances and carbon project credits, as well as growth of domestic forest cover.

1998: Increasingly worried about the costs of domestic emissions reductions and, in the face of industry pressure, unable to make enough progress on common regulatory policies and taxes,[81] the EU begins to develop an internal emissions trading scheme. But it insists on limits to global carbon trading, demanding that permits bought in from abroad be used to meet no more than 50 per cent of any country's emissions targets. The US opposes any limits on global trading and threatens to form a pact with Canada, Japan, Australia and New Zealand to meet all emissions targets by buying meaningless Russian credits created by the use of 1990 (before the post-Soviet economic collapse) as a 'baseline year'.

1999: The World Bank sets up a Prototype Carbon Fund (PCF) to generate cheap credits from Southern carbon-saving projects that can 'reduce the costs of emissions reductions for industrialised countries'.[82] The PCF quickly attracts investment from Mitsubishi, BP, and other companies, as well as several governments. The International Emissions Trading Association, a corporate lobby group, is established through the cooperation of UNCTAD and the World Business Council for Sustainable Development.[83]

2000: The EU rejects a compromise that would have allowed the US limited credits for its own forest carbon sinks, allowed

it to buy credits for carbon sinks abroad, lifted the 50 per cent limit on the use of trading to meet domestic targets, and not punished it if it failed to meet any targets. European industrialists step up efforts to erode European opposition to unlimited carbon trading. Denmark experiments with domestic carbon dioxide trading.

2001: The US withdraws from the Kyoto Protocol. With carbon trading freed of the stigma of being associated with US intransigence, the EU reverses its opposition to the extensive use of trading.[84] Now holding the balance of power over whether the Protocol will be ratified, Japan and Russia demand extra carbon credits for their domestic forests. Desperate to hang onto the Protocol as a way of asserting EU leadership in global climate policy,[85] and already committed to its own emissions trading scheme and other climate legislation, the EU capitulates. Most NGOs celebrate an agreement they would have condemned a year previously, justifying it as a 'necessary compromise'. A 'rule book' for CDM and other Kyoto Protocol trading mechanisms is adopted after much wrangling, protecting loopholes that essentially cancel out the Protocol's minimal emissions cuts.

2003: Northeastern states of the US begin to develop a Regional Greenhouse Gas Initiative that would use trading to cut the costs of a proposed 10 per cent cut in emissions from power plants by 2020.

2004: Defying environmentalist objections, the EU decides to allow countries to use credits from carbon projects outside the EU to meet EU emissions targets.[86]

2005: The EU Emissions Trading Scheme comes on line with broad backing from NGOs. The Kyoto Protocol comes into force after being ratified by Russia in 2004, again with broad NGO support. It becomes obvious that many industrialised signatories will not meet their 2008–2012 emissions targets. New procedures are adopted for speeding the flow of CDM credits into the system. Kyoto signatories 'agree to discuss' emissions targets for the second compliance period beyond 2012. Countries without targets such as the US and China agree to a 'non-binding dialogue' on their future role in curbing emissions. The US proposes an Asia-Pacific Partnership for Clean Development and Climate to seek technological fixes for global warming.

2006: The EU carbon market crashes, due partly to governments having given their corporations too many property rights in the earth's carbon dumps for the commodity to be sufficiently scarce (see Chapter 3). Projects expected to deliver some 420 million tonnes of carbon dioxide credits by 2012 are registered with the CDM by mid-year, injecting still more assets into global carbon trading systems.

Early history of the market fix

The market fix for global warming could not have become so dominant if it came out of nowhere. Part of its success is owed to the fact that it is part of a larger, more longstanding historical wave of neoliberalism.

Internationally, neoliberalism is a movement using institutions such as the World Bank, and the World Trade Organisation, along with various treaties, to establish new forms of globally-centralised control over far-flung resources. Attempting to integrate trading systems worldwide, neoliberalism reorganises property rights systems and fights regulation in an attempt to reduce the power of national governments, labour unions and local communities over corporate activity.

Justifying neoliberalism is an ideology of 'efficiency' developed over decades, largely in the think-tanks, academic economics departments, international agencies and government ministries of Anglo-America. The ideology revolves around the claim that society as a whole will benefit if it 'makes the most' out of whatever stuff is available to it.

That seems reasonable.

Sure – as long as everybody agrees on what it means to 'make the most' out of the stuff you have.

How do you tell when you've made the most out of what you have?

On a neoliberal view, you first divide all your stuff into a lot of different bits. This isn't always so easy. The categories the bits are divided into don't always reflect the categories people use to live their lives.

For example, you might be forced to divide your land into 'permanent forests' and 'permanent fields' even if you're a member of an indigenous group that doesn't demarcate land this way and instead uses some areas as woodland during some periods and as fields during others.

Or you might be forced to divide your activities into 'labour', 'housework' and 'leisure', even though you're not used to looking at things that way either.[87] Or you might have to divide your state welfare institutions into pieces that can be more easily managed for profit.

It's a bit like taking a picture and sawing it into a jigsaw puzzle. You wind up with a lot of odd-shaped pieces with a bit of blue sky and cloud here and half an eye or a piece of a house over there.

So what's next?

You transform all these jigsaw puzzle pieces into 'resources' and 'commodities'. A resource is something whose value lies in being a 'source' of something else, usually an abstraction called wealth.[88] A commodity is something whose value lies in what it can be swapped for or what price it can fetch. So you wind up treating your bits not as pieces of a picture that happened to get separated from each other, but as things that are on their way to being something else, something to do with industry and wealth.

And then?

Now you shuffle all the pieces together with a view to finding out who should get them and what new thing can be made out of them as a whole. Crudely speaking, you see which way of distributing, using, keeping or destroying your bits makes the most money. That's how you find out how to make the most out of the stuff you have.

Economist Ronald Coase, who insisted that a polluter should not be seen as someone 'doing something bad that has to be stopped'. According to Coase, '[P]ollution is doing something bad and good. People don't pollute because they like polluting. They do it because it's a cheaper way of producing something else. The cheaper way of producing something else is the good; the loss in value that you get from the pollution is the bad. You've got to compare the two. That's the way to look at it.'[90]

Neoliberals say not only that dividing and redistributing all your stuff into these interchangeable bits is a good idea, but also that what will tell you how to make the most of them is a special computer called the 'perfect market'. Feed your bits into the perfect market and the result will be that everything gets used or destroyed in a way that maximises total production.

Wow. But what does all this have to do with climate change?

That's the contribution of Ronald Coase, a University of Chicago economist who wrote a series of influential articles in the middle of the last century. In a way, Coase is the grandfather of pollution trading (and thus of the Kyoto Protocol). In some ways, he's also the presiding economic spirit of the 1992 Earth Summit and the international environmental agreements that followed.[89]

Coase's idea was that a pollution dump is just another jigsaw puzzle piece – just another resource or commodity. The right to pollute is a factor of production just like the right to use land. In both cases, exercising your right naturally entails that some losses will be suffered elsewhere.[90] The only question is how significant those losses are.

To find out how best to use a pollution dump, you put it on the market together with the other bits you've created – like real estate, water, labour, rice, silver, forests, jet planes and mobile phones. You measure them all by the same yardstick and treat them all in the same way.

If the market is a perfect market – if it has no 'transaction costs', as Coase called them, and is inhabited by properly calculating, maxi-

mising economic agents with perfect information – the pollution dump will wind up being used in the way that contributes the most to society's 'total product'.[91]

If that means a lot of pollution, so be it. But there's no need to worry that there will be 'too much' pollution, because if the society got too polluted, you wouldn't get the best value out of other goods – your labourers might die, for example – and 'total product' would decline. The perfect market will select against that, automatically 'optimising' pollution so that there's neither too little nor too much.

I think I've heard this line of thought somewhere before…

It certainly made headlines back in 1991. That's when Larry Summers, former US Treasury Secretary and former president of Harvard University, built on Coase's view in a famous memorandum he wrote to colleagues when he was chief economist of the World Bank. 'The economic logic of dumping a load of toxic waste in the lowest wage country is impeccable, and we should face up to it,' Summers said. 'Underpopulated countries in Africa are vastly underpolluted.'[92]

Now I remember.

But if it's poor economics simply to say that pollution is 'bad' without looking at 'total product', it follows that it's also poor economics to say that polluters must be held liable for damages, or that they must internalise all costs, or that certain types of pollution have to be reduced 'whatever the cost', or that regulation or taxes should be based on that assumption.

To do that, Coase thought, would be to fail to 'optimise' pollution or maximise the 'value of production'. A tax that penalised both polluters and pollutees for losses to 'total product' might be a good thing (although Coase thought such a tax would be impossible to calculate), but not a tax that was based on the idea that some level of pollution was simply unacceptable.

Which is, as you've been saying, the idea now emerging from the science of climate change.

Yes. But bear with Coase at least until you hear what he had to say. Because what he said now dominates a great deal of world climate politics.

The idea of responsibility, Coase concluded, is of no use economically: 'Whether someone is liable or not liable for damages that he creates, in a regime of zero transaction costs, the result would be the same…

[and] you can expand that to say that it doesn't matter who owns what; in a private enterprise system, the same results would occur.' The important thing is to create property rights and reduce impediments to bargaining so that 'affected parties themselves can decide whether to restrict activities through private trading of rights'.[93] In a perfect market, pollution rights would gravitate into the hands of whoever could squeeze the most money out of them.[94]

But where are you going to find a perfect market? They don't exist.

No. And nobody knew that better than Coase himself. As he rightly stressed, a perfect market is only a figment of the imagination. But the conclusion he drew was that, in the real world, the state and the courts would have to lend a hand in giving rights to pollute to those who could make the most out of them.

Coase's successors, such as the economist J. H. Dales,[95] modified pollution trading theory further. While continuing to emphasise the importance of giving polluters rights to pollute, they avoided Coasean talk about 'optimising' pollution through trading. It should be up to the government, they said, not an imaginary 'perfect market', to set the best overall level of pollution.[96] In their hands, pollution trading became merely a way of finding the most cost-effective way to reach an emissions goal that had been set beforehand.

And when did all this begin to be put into practice?

The first major emissions trading programme was adopted in 1976 by the US Environmental Protection Agency. It allowed new polluting plants to be built in exchange for 'offsets' that reduced air pollution by a greater amount from other sources in the same region. A 1979 policy allowed polluters to meet emissions targets through any combination of on-site emissions reductions. Then, in the 1980s, academics advocated market fixes as cost-effective alternatives to regulations that would have required more technological change. A backlash against the environmental regulation of the 1970s encouraged business to team up with some Washington-based NGOs to formulate trading legislation.[97]

In the increasingly strident neoliberal political climate of the 1980s and 1990s, pollution trading became more and more fashionable.[98] Finally came the Clean Air Act Amendments of 1990, which set up a national sulphur dioxide trading programme to save power plants money in the effort to control acid rain, as well as encouraging states to use emissions trading to reduce urban smog.[99] That paved the way for later US trading programmes in water pollution, wetlands

destruction, biodiversity depletion and so on. By the early 1990s, with the blessing of the Clinton regime, pollution trading was poised for its leap into the climate arena. In an atmosphere of privatisation, the thing to do seemed to be to privatise the atmosphere.

'All that is solid melts into air'

The neoliberal approach that currently dominates global warming politics does more than just reorganise the earth's carbon-absorbing abilities. At a time when 'oil and state' are merged at the highest levels of US government,[100] it is also helping dissolve most of the conventional boundaries that used to divide private corporations, governments, the UN, scientists, academics, consultancies, think-tanks, non-government organisations and even artists. As institutional borders disappear, so do checks and balances that could have restrained the blunders and excesses of carbon trading.

Pollution trading itself is no corporate conspiracy, but rather a joint invention of civil society, business and the state. Non-governmental organisations (NGOs) have been nearly as prominent in its development as private corporations.

Are you serious?

Completely. Although pollution trading derived from the theories of economists working in universities and think tanks,[101] it was written into the 1990 US Clean Air Act Amendments by Environmental Defence, a corporate-friendly NGO that subsequently pushed for it to be included both in the Kyoto Protocol and in Chinese environmental programmes.[102] The Washington-based NGO World Resources Institute (partly bankrolled by government and UN agencies, international financial institutions and corporations such as Monsanto, TotalFinaElf, Shell, BP, and Cargill Dow) tirelessly lobbied for carbon trading alongside the World Business Council for Sustainable Development and other corporate pressure groups. The World Wide Fund for Nature (WWF), an organisation with an annual budget 3.5 times that of the World Trade Organisation, meanwhile joined the European Roundtable of Industrialists (UNICE) and the US think tank-inspired Centre for European Policy Studies in support of the EU Emissions Trading Scheme.[103] WWF also helped develop an eco-label for the Kyoto Protocol's Clean Development Mechanism projects (see Chapter 4). Greenpeace, for its part, has moved from being critical of corporate lobby groups and carbon trading to complete acceptance.

As forest conservation NGOs such as the Nature Conservancy and Conservation International move in to mop up corporate and World

Bank finance being offered for 'carbon sinks', other NGOs confine themselves to trying to reform or 'contain the damage' done by trading programmes such as the Clean Development Mechanism (CDM). Most Northern members of the largest NGO grouping on climate change, the Climate Action Network, have thrown their support behind the carbon market, often demoting themselves to the role of advisers to governments on such matters as national emissions allocations. Critical NGOs, to borrow the words of Daphne Wysham of the Institute for Policy Studies, are being continually urged 'to unite behind an entirely bizarre, incomprehensible, and totally corruptible system of carbon trading'.[104] Even well-meaning artists such as sculptor Damien Hirst and rock group Coldplay have got into the act as both clients and spokespeople for carbon marketing firms.[105]

What's the UN's role in all this?

Business meets and greets in exhibition and conference spaces at UN climate meetings.

As carbon trading moved into the centre of international climate policy, UN climate conferences began to resemble trade fairs more than international environmental negotiations. From the start, umbrella groups such as the International Petroleum Industry Environmental Conservation Association, the Transatlantic Business Dialogue and the Emissions Marketing Association have been in touch with national governments to promote market approaches to global warming, and corporation executives even sit on country delegations.[106] At today's UN climate negotiations, carbon traders, consultants, manufacturers associations, fossil fuel, mining, nuclear and forestry companies, together with lobbyists and other corporate representatives of all kinds, easily outnumber both government delegates and environmentalists.[107]

Early on, the rot also spread to UN agencies other than the UNFCCC as well.

Such as?

The World Bank, which provides billions of dollars in public money to fossil fuel companies for their production and transport expenses, profitably expanded its remit to host seven different carbon funds aimed at providing cheap credits to corporations to allow them to continue to use fossil fuels.[108]

In addition, in the late 1990s, the UN Development Programme (UNDP) put its head together with the World Business Council on Sustainable Development to get companies involved in CDM projects[109] and, together with the Food and Agriculture Organisation, sponsored research into carbon sinks and carbon accounting.[110] By 2006, UNDP was pushing for an international pollution permit trading system that

it claimed could deliver USD 3.64 trillion in global wealth.[111] The cash-strapped UN Environment Programme meanwhile infuriated many environmentalists in 2000 by trying to position itself as a broker for CDM projects, including carbon 'offset' forestry projects in Africa.[112]

Is there more?

A lot, but it's not always visible to the naked eye. A good deal of corporations' work with the UN goes on behind the scenes. One example involves the International Chamber of Commerce (ICC), a powerful corporate lobby group that has played a huge role in global negotiations since the 1992 Rio Earth Summit. Shortly before the 1998 climate talks in Buenos Aires, the ICC, together with Shell, Texaco, Mobil and Chevron, sent a 30-person team to Senegal to round up support for the CDM from the energy and environment ministers of more than 20 African countries. In return, the companies offered technology transfer and foreign investment.[113] Similar efforts with forest-rich Latin American nations have helped recruit nearly all their governments to the cause of carbon forestry.

As carbon-trading businesses fused with the UN climate apparatus, revolving doors between the two became jammed with profiteers moving in both directions. In 1991, the UN Conference on Trade and Development (UNCTAD), an agency charged with 'assisting developing countries', brushed aside other regulatory or tax alternatives to set up a department on greenhouse gas emissions trading. UNCTAD later helped form the International Emissions Trading Association (IETA), a corporate lobby group dedicated to promoting emissions trading. Frank Joshua, who served as the UN Head of Greenhouse Gas Emissions Trading and led several expert groups including the UNCTAD Earth Council Emissions Trading Policy Forum and the UNCTAD Expert Group on the Clean Development Mechanism, went on to be the first executive director of the IETA, Global Director of Greenhouse Gas Emission Trading Services at Arthur Andersen, and managing director of US-based carbon trader Natsource – all of which are cashing in on the accounting rules Joshua himself helped to enshrine in the UN.[115] James Cameron, a lawyer who helped negotiate the Kyoto Protocol, later became Vice Chairman of Climate Change Capital, a carbon-trading merchant bank.[116]

At the same time, staff of corporations and other organisations in a position to benefit financially from carbon trading occupied positions on UN expert panels that decided on the rules that would determine their future profits.[117]

Sticker on the window of a London chain store that buys carbon credits from the Carbon Neutral Company (formerly Future Forests). The credits are claimed to 'neutralise' the store's greenhouse gas emissions. The Carbon Neutral Company is the secretariat of the UK Parliament's All-Parliamentary Climate Change Group, which numbers over 100 Members of Parliament from all three major parties. The Group counts promotion of the Carbon Neutral Company's 'carbon-neutral' idea among its objectives.[114] Chairman Colin Challen, MP, defends the sponsorship deal as standard parliamentary practice.

Globalisation and Carbon Trading: Two Complementary Views

'The response of global business to new legal frameworks is creating new relationships … the carbon market can be easily grafted onto powerful financial markets that can bring amoral scale… Consider colleagues of mine at Climate Change Capital, an Australian woman who built experience in the carbon market at the World Bank, a Hungarian educated in the US who founded an organisation in his twenties to work on the climate change issue, working together with a Chinese plant manager in a hard hat during endless dinners with unusual foods, vast amounts of alcohol, explaining how international law works and why we must have English law govern the contract and at the end there is opportunity for wealth to be created here in cosmopolitan London and the rapidly developing world.'[118]

James Cameron, Vice Chairman, Climate Change Capital, 2005

'A lot of "offsets" are produced by consultants. Example: you own a steel plant in a poor country that turns scrap metal into new steel. It is an old-fashioned basic oxygen furnace (BOF), and it is finally completely worn out. A rebuild won't do this time; it needs to be replaced. There is hydroelectric power in your area. You can save a lot of money by buying an Electric Arc Furnace (EAF) and using that for processing your scrap metal. But you know that EAF is a lot cleaner and greener than your old BOF. Isn't there some way you can get paid for this? Why, yes, there is. Call in a certified carbon market consultant and pay him a nice fee. He will produce a study certifying that you could have gotten ten more years out of that old BOF, and that the only reason you are investing in a new EAF is carbon credits. *Voila!* The carbon market will examine the report, find it convincing, and a new annual producer of offsets is born – which a "green" rock band can buy to justify burning petroleum in planes and buses. "Mommy, where do carbon offsets come from?" "Well, you see, honey, when a polluter and a consultant love money very, very much, they come together in a very special way to produce an extremely long piece of paper."'[119]

Gar Lipow, systems analyst and peace activist, 2006

In addition, the small circle of private carbon consultancies that help design and, with the permission of the UN, validate, verify and certify greenhouse gas-saving projects in the South have little incentive to question the effectiveness of the carbon projects they work on, since to do so would be to jeopardise their chances of getting future work. It could also jeopardise their relationships with their other clients. For example, the Norwegian-based Det Norske Veritas (DNV) consultancy, under contract to the World Bank's Prototype Carbon Fund (PCF), recommended the controversial Plantar scheme (see Chapter 4) as a CDM project. Yet DNV also has significant consultancy contracts with two of the PCF's investors, Statoil and Norsk

Hydro. One validator, which had not even visited the project it was validating, was actually part-owned by a parent-company that was an investor in the CDM project. After a meeting with the CDM Executive Board in 2005, validators agreed to take measures to avoid such incidents in the future, without specifying what such measures would consist of or how they would be enforced. 'We must establish self-justice internally,' said Einar Telnes of DNV.[120]

Advertisement for DNV Climate Change Services, Milan, December 2003.

Hasn't anyone at the UN ever heard of conflict of interest?

Sometimes it's hard to say. Conflict of interest has become so routine in international climate politics, as elsewhere under neoliberalism, that the concept has virtually disappeared. Despite being prodded by NGOs such as the World Rainforest Movement, the UN has declined to acknowledge the issue. To try to keep vested interests out of the rule-making process for carbon trading, said John Houghton, a member of the IPCC Bureau which appointed the land use review team, would 'cut out important experts'. In his view, 'It's impossible to flush out everybody.'[121]

Three in one

This chapter has suggested that a market fix, a technological fix and a knowledge fix have come to be intertwined in climate change politics in an intimate way.

The recent US neoliberal innovation known as the pollution market, growing largely out of academic theory, NGO advocacy and an anti-regulation backlash among corporations, moved with startling speed into international climate politics in the 1990s. Fed by a corporate-friendly reading of climate science and economics, as well as research into technological fixes, it drew UN agencies and activists alike into its gravitational field, eventually triumphing over early Southern and European opposition through complex and still partly obscure political processes. An astonishing range of institutions from private companies to UN agencies, university departments and NGOs are now aligned around an agenda characterised by rejection of precaution, inability to come to terms with indeterminacy and irreversibility, insistence that tradeoffs are always possible, and support for growth in corporate power.

The market fix, the technological fix and the knowledge fix have come together to encase international climate politics in a debate in which almost the only questions spoken are the narrow ones large corporations most want to hear. Is there or is there not human-caused climate change? If there is, what might make continued fossil fuel use possible? How can more subsidies be channelled to technologies corporations can profit from? How can privatisation and 'efficiency' be furthered in a way most acceptable to the public? Such questions are uniting the most cynical corporate hack and the most innocent environmental activist in a single agenda. The consequences of bypassing the central issues of fossil fuel overuse, ownership, corporate power, free enquiry and democracy will be explored in the next chapter.

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Chapter 3
Lessons unlearned

In which carbon trading, contrary to slogans about the universal effectiveness of markets in dealing with environmental and social problems, is shown to be ill-suited to addressing climate change. The experience of the US in pollution trading is demonstrated to be an argument not for, but rather against, making carbon markets the centrepiece of action on global warming.

Introduction

Pollution trading, the last chapter has pointed out, is a US invention now at the centre of efforts to address climate change worldwide. It's being enthusiastically pushed by governments, international organisations, business and even many NGOs.

The rest of this special report will argue that this approach isn't working, and even threatens to derail more constructive movements to address global warming. The US experience with pollution trading is an argument not for, but rather against, greenhouse-gas trading programmes such as the Kyoto Protocol and the European Union Emissions Trading Scheme.

But I thought pollution trading was a huge success in the US!

That's what carbon trading proponents often say. The reality is more complicated. US pollution trading schemes have produced no more reductions, and spurred less innovation, than traditional regulation, to say nothing of other possible programmes for cutting emissions. US pollution trading schemes have cut only short-term costs, and only for some actors, have raised many questions of equity, and in many ways have distracted attention from fundamental issues.

Equally importantly, the conditions that made possible the best-designed US emissions trading scheme – the US's sulphur dioxide programme – are simply not present in global regimes for controlling greenhouse gases.

I don't understand. What could be wrong with trading? Isn't trading always the most efficient way of reaching a given goal?

Carbon trading's claim to be 'efficient' is certainly its main attraction – together with its claim to be able to stimulate change in a relatively politically 'easy' way. But to decide whether such claims are true, you need to look carefully at specific cases.[2]

Trading's 'efficiencies' tend to conceal a lot of 'inefficient' stage-setting: arranging infrastructure, working up a legal framework, and so forth. Global trade in paper pulp, for instance, becomes 'efficient' only after subsidies or violence have gone into building roads and ports; securing large-scale, contiguous areas for producing raw material; finding ways of convincing people that local land is of 'greater economic value' when under tree plantations than when treated as a commons; hiring and training police; ensuring sustained high demand; and so on.[3]

'Emissions trading derives from economic theory and a small amount of empirical evidence from US practice, untested on a global scale, and certainly untested in the various economies in which these mechanisms must work.'[1]

Ruth Greenspan Bell, Resources for the Future, 2006

At the same time, trading is often a singularly *in*efficient way of attaining goals that require sweeping structural changes in society, or that place local rights before accumulation. It's also inefficient when the necessary conditions for trading – measurement instruments, legal institutions and so forth – are inadequate.

Where pollution trading is possible at all, it can get in the way of achieving changes of the kind required for breaking industrialised societies' addiction to fossil fuels. Its cost savings, while often real, tend to fall only to some members of society. In addition, it can exacerbate political conflict. Pollution trading, in short, only makes harder the difficult job of broad-based political organising required for coping with global warming. To put it another way, the 'efficiency' that is fostered by trading is often not *effective*.

Why is that?

Broadly, there are five reasons, and they are what this chapter is about.

First, in order to work, greenhouse gas trading has to create a special system of property rights in the earth's carbon-cycling capacity. This system sets up deep political conflicts and makes effective climate action exceedingly difficult. *Second*, pollution trading is a poor mechanism for stimulating the social and technical changes needed to address global warming. *Third*, the attempt to build new carbon-cycling capacity is interfering with genuine climate action. *Fourth*, global trading systems for greenhouse gases can't work without much better global enforcement regimes than are likely in the near future. And *fifth*, building a trading system reduces the political space available for education, movement-building and planning around the needed fair transition away from fossil fuels.

Property rights and privatisation

In any trading system, traders need to own what they sell. Pollution traders are no exception.

The very 'basis of emissions trading,' says former World Bank chief economist Sir Nicholas Stern, 'is assigning property rights to emitters, and then allowing these to be traded'.[4] As University of Texas Law School property specialist Gerald Torres explains, in emissions trading systems 'an emitter is not only legally obligated to reduce emissions down to the limit specified on its permit; it is also legally entitled to emit up to that amount'.[5] As a result, 'legal instruments providing evidence of ownership'[6] are a universal requirement of all tradable permit systems.

Who gets these property rights? And how do they get them?

That depends.

Under a scheme advocated by many economists, they are sold to polluters by government. Under a scheme backed by many environmentalists, they are given to a trust which sells them to polluters at intervals and distributes the revenue to citizens. But under most real-world trading schemes, including US pollution trading programmes, the Kyoto Protocol and the EU Emissions Trading Scheme, they are given to a selection of historical polluters – wealthy countries and companies – for free.

The US acid rain programme, for instance, handed out sulphur dioxide emissions rights free of charge to several hundred large industrial polluters – companies such as Illinois Power and Commonwealth Edison. The Kyoto Protocol dispensed greenhouse gas emissions rights to 38 industrialised countries who were polluting the most already. Although the South was allowed to continue emitting greenhouse gases unimpeded for time being, it got no allowances to trade. The first phase of the European Union Emissions Trading Scheme, which got under way in 2005, donated carbon dioxide emissions rights to 11,428 industrial installations, mostly in the high-emitting private sector.[7]

In other words, like rights to many other things that have become valuable – oil fields, mining concessions, the broadcast spectrum – rights to the earth's carbon-cycling capacity are gravitating into the hands of those who have the most power to appropriate them and the most financial interest in doing so.

Whoa, whoa, whoa! I don't believe it. The United Nations would never give away a public good to rich nations. European governments would never give away rights to the global carbon dump to its own corporations. Who would allow such a thing to happen?

It's already happened. The Kyoto Protocol gives Germany, France, Sweden and the rest of the European Union formal, transferable rights to emit, in 2012, 92 per cent of what they were emitting in 1990. Japan and Canada get 94 per cent, Russia 100 per cent, Norway 101 per cent, Iceland 110 per cent. Under the EU Emissions Trading System, the UK government alone hands out free, transferable global carbon dump assets worth around €4 billion yearly (at June 2006 prices) to approximately a thousand installations responsible for around 46 per cent of the country's emissions (see table 2, p. 89). Saleable rights to emit 145.3 million tonnes of carbon dioxide per year were given out to power generators, 23.3 million tonnes to iron and steel manufacturers, and so forth.

'The road to the free market [had to be] opened and kept open by an enormous increase in continuous, centrally-organised and controlled interventionism… laissez-faire *economy was the product of deliberate state action.'*[15]

Karl Polanyi (1944)

But surely this is a misunderstanding. These emissions trading programmes are giving out 'allowances', not rights to pollute. The Marrakech Accords – the 'rule book' for the Kyoto Protocol – states clearly that the Protocol 'has not created or bestowed any right, title or entitlement to emissions of any kind on Parties included in Annex I'.[8] *The EU ETS creates discrete permits under a regulation, not property rights. And the US Clean Air Act Amendments of 1990 are likewise careful to specify that a sulphur dioxide allowance 'does not constitute a property right',*[9] *while a proposed US law setting up a greenhouse gas trading scheme also stipulates that 'tradeable allowances are not a property right'.*[10] *So relax! No one's giving anything away to polluters. The world's capacity to recycle carbon is not being privatised.*

If only it were so! In fact, things are more complicated – and more disturbing. When governments say they are not giving out property rights, what they mean is that they are not giving out a particular *kind* of property rights. But they are giving out property rights of another kind – ones which do contribute to the privatisation of a global good.

You'd better explain what you mean.

Let's begin by acknowledging that there are good reasons why governments are afraid to mention the words 'property' and 'rights' in laws and treaties governing emissions trading.

An emissions trading system has to cut emissions and prove it is doing so.[11] It can do that only if it reduces the amount of pollution allowances in circulation. Governments have to be able to confiscate some

of the emissions allowances they gave out previously. And they have to be able to confiscate them without compensating their holders.[12]

Why?

Imagine what would happen if the government had to compensate permit-holders every time it tightened an emissions 'cap' by taking away some of their allowances. Taxpayers would have to pick up the bill for every emissions reduction that corporations made, and the bill would be 'prohibitively high'.[13]

In a housing market, homeowners need to know that the government can't simply take their rights to their houses away from them without compensation and sell the houses, pocketing the proceeds itself. But in an emissions market, it's essential that the government *does* have the power to take away some of the rights to pollute it has given or sold to companies or individuals. The property rights in an emissions market, in other words, must be less 'absolute' than the property rights in a car market. And in the case of carbon trading, it's especially important that governments be tough about taking away allowances.

Why?

Because they're going to have to take away so many in order to forestall climate chaos.

In the first phase of the Kyoto Protocol, governments have handed out, to industrialised countries alone, several times more rights to the world's carbon cycling capacity than are available if global temperatures are not to rise by more than, say, 2 degrees Celsius.[14] Having given a temporary stamp of approval to this huge overflow, governments will have to commit themselves to taking away an especially large proportion of those rights in the future.

Unfortunately, the rightsholders in question – powerful Northern governments and their heavy industries – are not going to give them up without a fight. In fact, the fight has already started (see below). So the job of dispossessing them of their carbon emissions permits not only carries much higher stakes, but will also be politically much harder for the UN and world governments to carry out, than the job the US government faced in taking away sulphur dioxide permits.

That means governments will have to make it especially clear in the case of global warming that emissions allowances are only temporary.

Exactly! And if allowances are temporary, they're not property rights. Therefore nothing is being given to Northern countries, or their polluting industries.

Sir Henry Maine and the Right to Pollute

In order to use, defend, steal or appropriate the things they want and need, people have invented property rights of many different kinds. Today, there are property rights governing everything from land and water to birds' nests, ideas and DNA. There are rights to exclude, to use, to benefit from, to inherit, to manage, to transfer. There are rights that are held by communities, rights that are held by individuals, and rights that are held by the state. There are permanent rights and temporary rights. There are freeholds, leaseholds, licenses, patents, easements, quotas, copyrights, concessions, and usufructs. There are formal rights and informal rights, written and unwritten. There are hundreds of kinds of commons rights. Such systems of rights overlap and even interpenetrate. A single plot of land may be seen as private, public and common property by different groups. Private property is guaranteed by but subject to the authority of the state and the public; individual user rights of commoners tend to be granted at the will of the community.

A century and a half ago, the British jurist Sir Henry Maine recognised something of this diversity and complexity when he compared different kinds of property systems to different 'bundles of sticks.' Some bundles include the right to pass on the good in question to your heirs, some do not. Some bundles include the right to buy and sell, some do not. And there are many other rights, or 'sticks', as well, each of which may or may not be in any particular bundle: rights to use, to have access to, to manage, to exclude, and so forth. The number of possible 'bundles' is dizzying. And some may have few or no sticks in common with other bundles. As political scientist Elinor Ostrom notes, 'None of these rights is strictly necessary… Even if one or more sticks are missing, someone may still be said to "own" property… one must… specify just what rights and corresponding duties [a] regime would entail.'[16]

Tradeable pollution allowances and credits fit easily into this conception of property. They are

- 'Enforceable claims to use something'[17] – to pour carbon dioxide into the oceans, soil and vegetation;
- 'Enforceable rights to benefit from something'[18] – to make money through trading allowances, for example, or to gain a competitive advantage through access to free carbon dump space that others have to pay for;

Pollution allowances and credits also contain other 'sticks' such as

- Tradability;
- Excludability – for example, Scottish Power cannot use Ineos Fluor's allowances or credits.[19]

So when a law says that emissions allowances are not property rights – meaning merely that they are not permanent – it should not be taken literally.

It's not so simple. Just because something is temporary doesn't mean it's not a property right.

Property rights come in many shapes and sizes (see box: 'Sir Henry Maine and the Right to Pollute', opposite). A lot of property rights *are* temporary. Think of monthly or yearly leases. Think of mining, logging or grazing concessions that governments give out to corporations for 30 years or 75 years. Think of copyrights, trademarks, and licenses. Think of fishing quotas or seed, gene or drug patents, all of which expire after a certain length of time.

All of these temporary property rights have been used to privatise or enclose various goods. All have been used to make billions for private companies. And all have been used to transfer wealth and power to the rich, sometimes igniting bitter conflict over democracy and how human beings' environments are to be treated.

Emissions allowances are no different. Industry, economists, governments and legal scholars all agree that, in giving away these allowances, emissions trading schemes do give away something quite substantial.

As the International Accounting Standards Board notes with regard to the EU ETS, allowances are 'assets…owned by the company concerned…and as such represent a significant and immediate creation of value to companies'. They should be seen as a 'government grant, and accounted for as such, i.e. treated as deferred income in the balance sheet and recognised as income on a systematic basis'.[20] Temporary or not, emissions permits constitute a 'major input factor to production.'[21]

Allowances aren't valuable just because they enable polluters to avoid having to spend money on pollution control. They also enable corporations to borrow money more easily and give them a better share price. And they set a precedent for granting them further entitlements. They can also be bought and sold for clear profit. They have market value. It matters who they are given to.

I still don't understand. How can you have rights over something as intangible as the earth's carbon-cycling capacity?

Companies have legal rights over all sorts of intangible things. Drug companies own genes. The Disney Company owns the Winnie-the-Pooh story. General Electric and Rupert Murdoch hold temporary rights over parts of the broadcast spectrum – rights that they are now trying to make permanent.[22] Other companies own new ideas for their production lines.

What's Property Got to Do with It?

Transforming the earth's capacity to maintain a liveable climate into formal property has practical consequences. As the Canadian political scientist C. B. Macpherson once put it, a property right is a 'right in the sense of an enforceable claim to some use or benefit from something'.

That word 'enforceable' is crucial. Rights give access; rights give power. Property is not a relation between an individual and a thing, but, crudely speaking, between people and people. Individuals hold objects only through the sanction of some community or government. The law may or may not be involved, but realising property rights depends on a whole raft of social factors that include trust, access to authority and knowledge, and perhaps also access to markets, capital, measurement technology, records, accounts, labour and identity.

So when systems of private property are introduced in a good like land or the earth's carbon-cycling capacity, the changes are not abstract. They involve the physical mobilisation of lawmakers, accountants, lawyers, surveyors, consultants, journalists, engineers, police, banks and all the associated paraphernalia of offices, maps, calculators and so on. In the process, new means of persuasion and coercion become possible. New groups or professions gain new powers and privileges. Power and knowledge are redistributed. Some gain, others lose.

Take the system of private property for land introduced in Egypt in the 1850s. The system recognised existing claims to the land under Ottoman and local law, but added new courts, property registers, mechanisms of enforcement, institutions making possible acquisition and transfer, and sources of credit for those who wished to use their property as collateral.[23] European capital poured into the country. Local landowners and European entrepreneurs invested in new irrigation schemes and land reclamation in the countryside and housing and modern infrastructure in the cities. By the turn of the twentieth century the Egyptian stock market, whose largest share holdings were in mortgage companies and property development, was one of the most active in the world. Meanwhile, small farmers faced rapidly rising prices. Tax payments increased sharply, to cover mortgage payments on the estates of the ruling family. To obtain loans to survive crises such as cattle epidemics, farmers now had to mortgage their own land, giving creditors the power to seize the fields, animals, ploughs and houses of those unable to keep up debt payments. Farmers described the courts that enforced foreclosure decisions as 'a machine for transferring the land' from small farmers to the wealthy.[24]

The machinery of debt provided leverage for colonial occupation. When a global depression struck in 1874, the Ottoman viceroy in Cairo was forced to foreclose on his large cotton and sugar cane estates. British and French banking houses established a Debt Commission in Cairo, which took control of the country's finances and used the new courts to take possession of the viceroy's estates. When he resisted the takeover, the British and French governments installed his son in

his place. The subsequent rise of a constitutionalist movement led by junior army officers and disaffected notables provoked a British invasion in 1882 that reasserted European control over both finances and mortgaged property, including the extensive viceregal estates.[25] The private property system was further consolidated with a land survey more comprehensive than anything known at that time in Britain.[26] Despite belated attempts to slow down the rate at which villagers were losing their land and their homes to creditors, by the 1920s it was estimated that more than one third of the agricultural population in the Nile Delta had become landless.[27]

For Egyptian villagers, private property meshed with and modified existing power relations in ways that benefited some and harmed others. The same is true of the early ages of enclosure of commons in Europe's colonies and in Europe itself. And it remains true today. A World Bank-supported programme that issued 8.7 million land titles in Thailand beginning in 1984 paved the way for corrupt acquisitions of land by speculators, undermining villagers' tenure security and causing widespread rural conflict.[28] In Thatcherite Britain, privatisation of social housing ultimately turned 'working class housing estates into centres of intense gentrification' while producing 'homelessness and social anomie in many urban neighbourhoods.' Privatisation of utilities redistributed assets in a way that 'increasingly favoured the upper rather than the lower classes'. Argentinian privatisation resulted in a 'huge inflow of overaccumulated capital and a substantial boom in asset values, followed by a collapse into massive impoverishment.'[29] Not long after the Mexican government passed a reform law in 1991 that both permitted and encouraged privatisation of the *ejido* lands, 'divesting itself of its responsibilities to maintain the basis' for indigenous security, the Zapatista rebellion broke out. Extending intellectual private property rights over biological assets to communities whose 'political resources are not commensurate with their newfound economic resources'[30] may wind up damaging, not improving, livelihoods.

So it is only to be expected that current moves to turn the earth's carbon-cycling capacity into a tradable asset are viewed cautiously by many groups, out of concern for their practical effects. To bring the world's carbon-cycling capacity under a new system of property sparks social change and shifts the political character of the atmosphere and the earth's ability to regulate its climate. It has already transformed or reinforced a wide range of power relations – by, for example, creating new institutions to quantify, handle, regulate, distribute and police the new assets that are being given away.

The new carbon commodity is ghostly only in the sense that it's up to governments and governments alone to decide – on whatever grounds they choose, scientific or not – how scarce it is, and how much can be distributed, bought, sold and used. Tradable permits to pollute are what law professor and pollution trading advocate Richard Stewart calls 'hybrid property' – property conjured up by regulation and thus

dependent, even more than ordinary private property is, on a centralised, complex system of government control.[31]

One reason why talking about ownership is important is that some of the devastating climate dilemmas that governments and the UN are now caught in are a result of the property system that emissions trading requires.

A matter of realism

How's that?

For the market to work at all, 'interests in allowances must be sufficiently protected to protect investment'.[32] Indeed, guaranteeing that 'property rights can be assigned and enforced to ensure that trades can

Rent-Seeking and Carbon Trading

Rent-seeking, a phenomenon first named by economists Gordon Tullock and Anne Krueger, is the process by which a firm seeks to extract 'uncompensated value from others through manipulation of the economic environment rather than through trade and the production of added wealth'.[35]

Gordon Tullock and Anne Kruger

Lobbying for favourable economic regulation is one way of rent-seeking, especially when the regulator must rely on private firms for knowledge about the market.

If firms can calculate the cost of lobbying, bribing or otherwise causing the government to enact favourable regulation, then it can compare this cost with that needed to gain similar benefits through capital improvements or increased efficiency. If 'buying' a favourable regulatory environment is cheaper than improving production lines, then firms may reap uncompensated income. Spending money on influence-peddlers instead of improved business practice slows down growth in productivity.[36]

Rent-seeking is therefore often considered an example of corruption or the undue influence of special interests.

Carbon-trading programmes such as the EU ETS, in which pollution rights are given to private companies depending on how much they say they have been polluting in the past, are fertile grounds for rent-seeking. The notorious horse-trading over the allocation of pollution rights to national governments under the Kyoto Protocol is an analogous case.

As financial journalist John Kay writes in the *Financial Times*, 'When a market is created through political action rather than emerging spontaneously from the needs of buyers and sellers, business will seek to influence market design for commercial advantage.'[37]

take place in an ordered fashion and with a high degree of certainty' is *the* 'key role of the policy system' in an emissions trading scheme.[33] Nobody who holds emissions allowances, or is thinking of buying or selling them – whether polluter, broker, banker or investor – is going to want anybody to be able to take them away arbitrarily.

'The creation of formal legal title and property registration becomes a machinery for transferring property from small owners and concentrating it into larger and larger hands.'[39]

Timothy Mitchell, 2002

So just as corporations lobby for exemption from pollution regulations, they lobby to make sure emissions allowances amount to secure property rights and to get as many as they can. As 'semi-permanent property rights,' in the words of David Victor of the US Council on Foreign Relations, emissions permits are 'assets that, like other property rights, owners will fight to protect'.[34]

Luckily for corporations, their privileged access to legislators enables them to secure carbon dump commodity for themselves merely by lobbying and pressure politics. Just as systems of private property in land give new moneymaking powers to surveyors, officials and firms with access to titling and licensing mechanisms, the property systems of pollution trading schemes give new commercial powers to those with access to legislators.

As economists Peter Cramton and Suzi Kerr point out, the 'enormous rents' at stake 'mean that interest groups will continue to seek changes in the allocation over time':

> Firms may end up putting as much effort into rent capture as into finding efficient ways to reduce carbon usage. Investments may be delayed in the hope that high observed marginal costs would lead to more generous allowance allocations as compensation. The increased complexity of the programme… may lead some groups to seek exemptions or bonus allowances… [I]nterest groups will fight bitterly for a share of annual rents. This fight will lead to direct costs during the design of the policy. Groups will invest in lawyers, government lobbying, and public relations campaigns. Government officials will spend enormous amounts of time preparing and analysing options and in negotiations. This will lead to high administrative costs and probably considerable delays in implementation.[38]

Governments eager to placate industry are almost sure to give out too many emissions rights. This in turn will make future cuts even more difficult, while increasing pressures to reduce emissions in sectors that have not been awarded rights (for example, domestic households, the transport sector and the state).

But hang on a minute. Regulators can be influenced into handing out resources to big companies even without environmental trading schemes. You can't pin that problem on emissions markets.

No, of course not. Under any kind of regulation, regulators can be 'captured' by those they are regulating.[40] But emissions trading adds new complications. In extreme cases, governments under heavy corporate pressure to hand out large numbers of emissions permits may wind up creating too little scarcity even to make a market possible.

Of course, some governments may be able to resist more short-sighted types of business pressure and, bit by bit, cut the amount of property rights granted to the private sector. But questions about equality will remain, since whatever rights are left will still be in the hands of business and will now be worth even more in monetary terms. As Massachusetts Institute of Technology economist and cap-and-trade enthusiast A. Danny Ellerman admits, 'there is likely to be agreement on the creation of the scarcity only as there is agreement on the allocation of the rents thereby created'.[41]

Already, environmentalists are facing a battle to stop governments from giving out too many property rights much like the battles they've faced to organise movements for stricter conventional regulation. Emissions markets are no less 'political' a form of climate action than any other.

It sounds like you're suggesting that governments setting up emissions trading schemes are caught in a difficult bind. Any desire they might have to reduce emissions in line with scientific knowledge and the public interest pulls trading systems one way – toward giving regulators a free hand to modify allowances. Governments' need to reassure traders that they will not be expropriated unfairly pulls another way – towards protecting allowances against government modification and making them as much like full title as possible.

Yes. As legal scholar David M. Driesen of Syracuse University's School of Law puts it, there is a 'tradeoff' between the 'need to protect the public properly from environmental harms that may grow over time' and 'stability to encourage cost-decreasing trades'.[46]

How do governments handle this dilemma?

With difficulty. Take the US Clean Air Act Amendments of 1990, which launched the sulphur dioxide trading programme. In order to keep from having to pay legal penalties to corporations for making them reduce their emissions, the government had to find a way around the so-called 'takings clause' of the Fifth Amendment of the US Constitution, which prohibits 'private property' from being 'taken for public use, without just compensation'.

Yet to deny that emissions permits were property, as the law specified, worried members of Congress concerned to defend corporate privilege in a working market. A stable market, they said, depended on trust that

'Temporary' Property Rights that Become Permanent

In many circumstances, government-granted open-ended 'temporary' property rights become permanent in all but name. In countries around the world, 'temporary' commercial mining and logging concessions, leases and licenses – valid on paper for, say, 20, 30, 40 years or more – have frequently in effect resulted in handing over public or community lands to the private sector for good.[42] In Indonesia, for instance, wealthy interests have often held on to their vast timber leaseholds by converting them to plantation crops or exploiting their minerals, often using old logging roads and dispossessing hundreds of thousands of local residents who have little access to the judicial system.

The US example of grazing permits offers another illustration of how distribution of permits that the government nominally retains 'control' over can in effect privatise a resource.

Under the Taylor Grazing Act of 1934, grazing permits were given to those who were already the biggest users of rangeland – just as today's Kyoto Protocol and EU ETS allowances are given to those who are the biggest users of the atmospheric carbon dump. Like today's pollution allowances, too, grazing permits could be both limited and revoked. And like today's pollution allowances, they were explicitly claimed not to amount to 'rights, title, interest or estate in or to lands'. They were not protected against being taken away by government without compensation. Congress viewed them as mere privileges, not rights, and wanted the Department of the Interior to regulate the rangelands by adjusting the number of permits periodically.

Yet in the end, the permits 'essentially privatised the public ranges'. What they created was 'an odd species of property', 'less than a right but more than a mere revocable privilege'.[43] Ranchers' political clout meant that the Bureau of Land Management 'acquiesced in the creation of *de facto* private rights in the public rangelands while neglecting to improve range condition'.[44] Rather than hastening, tightening, streamlining and economising on environmental protection, the permits merely resulted in a different dynamic between regulators and regulated,[45] in which those to be regulated gained some new and different powers.

the government would not interfere with 'the property interest', which must be allowed to have recourse to the courts.[47] The Environmental Protection Agency's power to 'terminate or limit authorisation' of an allowance undermined 'the very concept of allowance trading'[48] and would make investment in excess allowances too risky.

What did the US lawmakers do about this contradiction?

They wished it away. On the one hand, they dutifully specified in the Clean Air Act Amendments that an emissions allowance 'does not constitute a property right' and can be 'terminated' or 'limited' by the government without compensation being due.[49]

Yet at the same time, they went out of their way to reassure polluters and utility investors that they 'should expect that allowances will partake of durable economic value and that commercial and other relevant law will apply to allowances and function to protect their value'.[50] A senator inserted an explanation into the record stating that allowances were commodities.[51] The Environmental Protection Agency expressed its 'intention to treat emissions allowances as if they were absolute property rights, except in exigent circumstances'.[52]

As economist A. Danny Ellerman and colleagues note,

> For [most] intents and purposes, the allowances are treated as [homogeneous and valuable] property rights. They are freely tradable, there are a variety of market mechanisms that mediate transactions, and the Environmental Protection Agency consciously allocated allowances to eligible parties for years beyond 2010 to provide confidence that they would be treated essentially as property rights. All this will clearly make it difficult politically to alter allowance allocations in the future.[53]

After all, as Ellerman and company explain, 'whenever valuable property rights are created by legislation, the associated allocation decisions are likely to be highly politicised in much the same way as is tax legislation or appropriations bills.'[54] In the US, Congress used up most of the time it spent debating the sulphur dioxide trading programme not on discussing environmental targets but on 'allocating valuable private property rights created under the scheme among clamouring interest groups ... dividing up the pork'.[55] Once these 'liquid, federally-created intangible property right[s]'[56] had been distributed, as economist Dallas Burtraw notes, they appeared in company accounts as gifts amounting to USD 2 billion in zero-cost assets yearly.

Companies were prevented from charging customers for something they had received for free, but they were allowed to pass through to customers costs of reducing emissions and of any extra allowances they had to buy to comply with the law. And they were allowed to make money by selling them; as Burtraw observes, 'if you discover oil on your property, you're not going to give it away for free'.[57]

No surprise, then, that squabbles over allowances early on led to civil litigation and other disputes.[58] At one point, the Wisconsin Public

Utility Commission had to rule that profits from sales of allowances should go to ratepayers, not stockholders.[59] Sulphur dioxide levels in the US actually increased by 4 per cent in 2003 as a result of the programme's banking mechanisms.[60]

Similarly for Los Angeles's Regional Clean Air Incentives Market (RECLAIM). Emboldened by economic theory and the Clean Air Act Amendments of 1990 authorising states and local air districts to develop market incentive programs, Los Angeles industry successfully lobbied local government to replace existing and proposed air quality regulations with a trading programme.

The South Coast Air Quality Management District (SCAQMD) allocated pollution allowances to 370 big polluters including oil refineries, power plants, aerospace companies, asphalt batch plants, chemical plants and cement plants. In response to industry pressure, the aggregate number of pollution permits issued was generously set equal to the amount of total pollution that would enter the air during periods of peak production and economic boom, when emissions were highest. Over 40,000 tonnes more permits to pollute with nitrogen oxides (NO_x) and sulphur dioxide were allocated in the first year than there was actual pollution.

As a result, reducing the number of credits in circulation at first didn't actually reduce emissions. In the first three years of the programme, the 'cap' was tightened by 30 per cent, but actual industrial NO_x emissions declined by at most 3 per cent, compared to a 13 per cent decline in the preceding three-year period. In 1999, ambient levels of NO_x actually increased, following a decade of consecutive reductions. RECLAIM arguably wound up reducing pollution more slowly than previous regulations that assigned control technologies or emissions levels for particular firms would have done if they had been continued. For example, RECLAIM allocations for NO_x were greater in most years of the program than the comparable allocations from the 1991 Air Quality Management Plan that RECLAIM replaced. Dismantling the previous regulatory regime also took time, costing lives.[61]

Emissions trading has also slowed down reductions elsewhere. For example, the US required 23 years to eliminate leaded gasoline through a trading programme, a task that took China three and Japan 10, without trading.[62] Even in the short term, the US lead trading programme can be said to have slowed the phase-out of lead in gasoline. Lead trading allowed refiners that banked purchased lead credits to continue exceeding lead limits through 1987, whereas the previous regulation had required refiners to meet the standard by 1986.[63]

OK, so maybe RECLAIM and other schemes may have slowed down pollution control a bit and given away a lot of assets in the atmosphere to big private companies. But didn't they work in the end?

They worked in the sense that they were part of a programme that reduced pollution. But continuing and strengthening previous regulation would have worked, too – and perhaps in a way that would have been less costly for society as a whole in the long term.

For example, lead could have also been virtually eliminated from petrol through conventional performance-standard regulation. And it might have been eliminated faster. The question is not only whether pollution control methods work, but how, how effectively, and for whose advantage.

History repeats itself

And you're suggesting that a history of problems with property rights in US pollution markets is being repeated with greenhouse gas emissions trading schemes?

Unfortunately, yes. Following in the footsteps of the US, parties to the UNFCCC have tried to paper over the dilemma that pits environmental effectiveness against the market's need for secure property rights. While wanting to give away rights to the global carbon sink, many signatories to the Kyoto Protocol are worried about being held liable for the resulting damages.

All along, too, the UNFCCC has had to fend off objections Southern governments and critical environmentalists have made to the giveaway of atmospheric assets to big polluters. One example was India's belated, quixotic 1999 demand for assurances that the Kyoto Protocol 'has not created any asset, goods or commodity for exchange'.[64] Some are also concerned that governments' gifts of allowances to business may amount to subsidies actionable under the World Trade Organisation.[65]

Governments know, in other words, that admitting openly that they're giving billions of dollars in assets to the worst greenhouse gas polluters could be both legal and political poison. That's why, in the 2001 Marrakech Accords, the parties to the UNFCCC were driven to stipulate that the 'Kyoto Protocol has not created or bestowed any right, title or entitlement to emissions of any kind on Parties included in Annex I.'[66]

But – just as in the US – the pretence is hard to maintain. Outside UN meeting halls, nearly every institution involved in carbon

trading, including the World Bank and the EU, acknowledges that both the EU Emissions Trading Scheme and various programmes created by the parties to the UNFCCC under the Kyoto Protocol have in fact created rights and assets worth billions of dollars.[67] PricewaterhouseCoopers, in an analysis of the tax implications of the EU ETS, has observed that 'trade in CO_2 [carbon dioxide] emissions is equated with the transfer of similar rights such as copyrights, patents, licensing rights and commercial and industrial trademarks'.[68] In 2005, a Dutch banker involved in carbon trading noted his satisfaction that European Union emissions allowances had become 'real property' in that governments had to compensate corporations in case of default.

Both the EU ETS and various trading-related institutions brought into being by the Kyoto Protocol are therefore arguably in breach of the Marrakech Accords, although no court case has yet been brought.

So carbon dioxide emissions trading schemes are putting more and more rights – and more and more power over climate – in private polluters' hands.

'The allocation of marketable pollution permits constitutes a form of limited privatisation', Indiana University law professor Daniel Cole observes, 'as the government conveys to private parties limited entitlements to use the public's atmosphere.'[69]

The politics is playing out exactly as it did in US pollution trading schemes. The Kyoto Protocol's effectiveness, for instance, has long been acknowledged to have been undermined by the granting of large amounts of excess allowances to countries like Russia for political reasons.[137] Giving huge amounts of rights to industrialised countries as a whole has meanwhile entrenched their expectations for further privileges – expectations that Southern countries are bound to upset if they ever agree to similar emissions limitations under a trading scheme.[70]

The EU Emissions Trading Scheme is plagued by similar problems. In April 2006, it became clear that corporate participants in the EU ETS had been granted around 10 per cent more allowances than they needed to cover their 2005 emissions. That translated to between 44 and 150 million tonnes of surplus carbon permits,[71] or, at €13 per tonne, up to '€1.8bn of free money'.[72]

In the UK, when environment secretary Margaret Beckett published her draft EU ETS allocations for British industry in May 2004, they added up to a total of 736 million tonnes of carbon dioxide for the next three years. The plan called for no emissions cuts whatsoever: industry had won tradable rights to emit yearly at least as much carbon dioxide as it had annually emitted *de facto* between 1998 and 2003.

Even so, 'intense lobbying by industry followed, apparently supported by industry minister Patricia Hewitt, and in October 2004, the expected business-as-usual emissions were substantially increased, and the permitted emissions *raised* to 756 million tonnes'.[73] This led to a prolonged legal row with the European Union which ended only in May 2006 with a British defeat.

In 2004, only a minority of companies believed that the EU ETS would result in any reduction in emissions at all.[74] By 2005, climate economist Michael Grubb was warning that the huge number of allowances being donated to industry would render them almost worthless, destroying any incentive for cleaning up.[75] By April 2006, Grubb's prediction looked to have some chance of coming true. As surplus emissions rights flooded the market, prices crashed 60 per cent within a week, from a high of around €30 per tonne of carbon dioxide to €11. Traders began to express the fear that the emissions price would drop to zero and that the first phase of the market 'would die.'[76] A European Commission representative refused to comment on whether member governments had 'allowed companies to wilfully overstate historical emissions when they were compiling their… national allocation plans, in order to receive more free allowances.'[77]

'The obvious thing to say now', observed one market analyst in May 2006, 'is that the caps must be corrected in the second phase, but what has happened recently makes us realise that if regulators are off with their estimates, prices will be either very high or very low. I am not sure that something with such an inherently unstable price is an incentive for people to invest. It is a fundamental flaw in the scheme.'[78]

With so many allowances being given out, even factors such as the fluctuations in fossil fuel use associated with yearly variations in weather are now playing havoc with demand, putting future prices in doubt. And prices may well stay volatile, especially since no European government wants to be the first to reduce radically the number of allowances granted to industry. All the signs are that EU governments are going to be pressured into handing out too many allowances in the second phase of the scheme, just as they did in the first.[79]

Table 2. Quasi-Privatisation of the Existing Global Carbon Dump by the UK *National Yearly Allocation under the EU Emissions Trading Scheme, 2005*

Industrial Sector (UK Only)	Annual Gift of Emissions Rights (Million Tonnes of CO_2)	Increase/ Decrease from Actual Average Emissions 1998–2003	Fraction of 'Available' World Above-ground Carbon Dump[a]	Approx. Annual Value at €16/tonne of CO_2[b]
Power Generators	145.3	-6%	1.5-3.0%	€2.325b
Iron and Steel	23.3	+16%	0.2-0.5%	373m
Refineries	19.8	+11%	0.2-0.4%	317m
Offshore Oil and Gas	19.1	+14%	0.2-0.4%	306m
Cement	10.7	+18%	0.1-0.2%	171m
Chemicals	10.1	+12%	0.1-0.2%	162m
Pulp and Paper	4.7	+18%	0.0-0.1%	75m
Food and Drink	3.9	+26%	0.0-0.1%	62m
Other Industries	15.1	+16%	0.2-0.3%	242m
Total	252.0	+2%	2.6-5.1%	€4.032b

[a]Figures in this column are not based on any attempt to estimate the earth's capacity to recycle transfers of fossil carbon with no remainder, which, even if initial assumptions could be agreed on, would probably be impossible in technical terms. Rather, they take as a point of reference the Intergovernmental Panel on Climate Change finding that anthropogenic CO_2 emissions from fossil fuel combustion and flaring must be reduced by 60–80 per cent from current levels of 24,533 million metric tonnes/year to achieve eventual stabilization of CO_2 levels at twice Industrial Revolution levels.

[b]Approximate price in early June 2006. For every tonne of uncompensated-for CO_2 emitted above the limit, companies face a fine of €40, rising to €100 from 2008 onwards. Columns may not add up due to rounding.

Sources: UK Department of Environment, Food and Rural Affairs, *Carbon Market News*.

But if emissions caps are ever tightened, companies will need either to make reductions or to pay up, won't they? And surely eventually it is the biggest polluters who will lose out at that point, no?

Yes, many corporations are sooner or later probably going to have to give something up. But emissions trading encourages them to treat global warming not as a social and environmental problem to be solved but as a business and public relations problem to be kept out of ordinary people's hands and to be managed at the least possible relative financial and market loss to themselves. And it gives them the means to make sure caps are not tightened very much or very swiftly. Far-sighted companies treat the carbon trading as an opportunity to gain *new* property rights, assets and openings for capital accumulation, even if climate change is accelerated in the process.

But isn't it the South and other parties currently not included in emissions trading schemes that will reap more benefits, financially speaking, as long as they don't have to pay for allowances?

As of now, the biggest polluters are granted the maximum possible advantages relative to smaller polluters. It is they who hold rights to the global carbon dump – not renewable energy system manufacturers, not non-polluting firms, not communities, not trusts, not campaigners who have prevented hydrocarbon development in their regions, not socially-responsible actors who have kept their societies on existing low-carbon paths, not (in Europe) the state sector, and not ordinary members of the public, North or South.

If emissions caps are tightened, moreover, when will they be tightened, and by how much? Politicians like to say that 'market approaches' like emissions trading will prevent the pain of other kinds of regulation. But if there isn't enough political pressure to reduce emissions in the first place, the result will be merely a gaming of the system and continual over-allocation of pollution rights. Carbon trading does not offer a way around the tough political decisions.

But surely some day the necessary political movement will come into being. And surely it will some day become more costly to emit carbon dioxide. And when it does, renewable energy companies will win out, because demand for their products will rise.

It's going to be a tough slog for renewable energy companies in the meantime, as long as they are deprived not only of the large subsidies and research and development money that continue to go into 'sunset' fossil fuel and nuclear technologies, but also of any assets handed out under emissions trading schemes.[80]

Well, all right. But I still can't get my head around the idea that the Kyoto Protocol and the EU ETS are simply 'polluter earns' programmes. After all, it's not as if European utilities, oil companies and steel manufacturers are just being handed free cash to do whatever they want with. They have to use their allowances to cover their emissions, no? They're not making any money out of them.

Well, it's funny you should mention that, because, actually, many of them are. As Garth Edwards of Shell explains, the 'opportunity cost of allowances is incorporated into the power price in countries with liberalised energy markets... . The largely free allocation of allowances means that power generators receive a windfall profit since their compliance costs are far less than their revenue increase'[81] from increased consumer prices.

While most assets given to companies under the EUETS do go toward covering emissions, their sheer volume guarantees new profit-making opportunities as well. Costs of buying extra pollution permits are being passed on to consumers without any incentives for systemic change being created, generating new profits for utilities and other corporations. Let's look at the facts:

- The big six UK electricity generators are getting around USD 1.2 billion per year in windfall profits from the EU ETS – even more than the GBP 500 million per year the UK Parliament's Environmental Audit Committee had earlier estimated.[82] None of this 'valuable income on their balance sheets'[83] need be spent on a structural transition away from fossil fuels.[84] 'A combination of free allocation to power stations and full pass-through of marginal costs to consumers has led to a massive increase in the electricity industry's profitability,' consultants IPA Energy noted recently.
- In the UK, oil companies BP, Esso and Shell have made millions of pounds by selling off surplus free EU ETS allowances, while National Health Service hospitals have had to pay tens of thousands of pounds to buy extra allowances.[85]
- In Germany, where power prices rose from €30 to €47 per megawatt-hour from 2005 to 2006, heavily-polluting power companies are being accused of profiteering off carbon trading. Major utility RWE is alone said to have made €1.8 billion in windfall profits in one year by adding the current market value of the EU allowances it had received for free to its customers' bills.[86]
- In Belgium, France and the Netherlands, some 40 to 70 per cent of the cost of freely-allocated EU ETS allowances is passed through to large and small consumers. Contrary to the stated objective of emissions trading, the system is stimulating investments in carbon dioxide-intensive power plants, according to the Energy Research Centre of the Netherlands.[87]
- In the Czech Republic, the electricity giant CEZ received one-third of the 97.6 million metric tonnes of carbon dioxide emission allowances issued to the country. (Only around 90 million tonnes of carbon dioxide were produced yearly in the country before 2005.) This will enable the company to make as much as USD 187 million from trading in carbon credits between 2005 and 2007, according to an analyst at Atlantik Financní trhy. After having made profits off carbon allowance sales in 2005 when prices were high, the company is looking to buy them back now that prices have dropped. As a result, 'we've also launched more coal production,' said Chief Executive Officer Martin Roman.[88]

- According to UBS Investment Research, the first phase of the EU ETS 'has probably contributed to €10–20/megawatt-hour higher power prices with a very significant redistribution of value from consumers to producers and between companies.' In May 2006, Estonian Energy declared a €74 million pre-tax profit from net sales of emissions rights in 2005, more than a third of its total profits. Based on the company's own environmental reporting, only €6–9 million can be explained by 'real emissions reductions'.[89]
- In the very first publicised spot trade of EU allowances in February 2005, Danish power utility Energi E2 was able to sell a block of rights it had been granted free by its government to Shell simply because a spell of mild temperatures had happened to keep the utility's carbon emissions slightly below expected levels.[90] The following year, Norway's Fortum Corporation bagged USD 25 million from selling carbon dioxide allowances due to the fact that the reservoirs behind its hydropower dams happened to be exceptionally full in 2005.[91]
- In Australia, New South Wales taxpayers are being charged millions of dollars by a state government trading scheme that 'aims to cut greenhouse gases but has done little other than provide windfall gains for some of Australia's dirtiest power stations'.[92]

None of this should have been a surprise. Under Los Angeles's RECLAIM pollution trading scheme as well, high prices of nitrogen oxides (NO_x) credits contributed to large increases in wholesale electricity prices.[93] Liberalised energy markets made the US sulphur dioxide programme vulnerable to a similar problem. Looking further back, members of the Organisation of Petroleum Exporting Countries garnered windfall profits by limiting carbon extraction in the 1970s.

But don't power utilities have to buy at least a few permits in order to continue business as usual?

Often they do – particularly utilities dependent on coal. But, as IPA Energy consultants found in a detailed report done for the UK government, large utilities are being allowed to 'over-recover carbon costs' by charging customers for the extra emissions permits that would be needed if their 'baseline' generating capacity were carbon-intensive coal plants rather than the less polluting mixture of technologies they actually use. (Coal's ratio of carbon content to heat production in kilogrammes of carbon dioxide to million British Thermal Units is 94, as opposed to oil's 78 and natural gas's 53. Production of carbon dioxide per megawatt-hour is 698–975 kilogrammes for coal, 470–820 for oil,

and 290–545 for gas, depending on the technology used.)[94] Last year the carbon price added about GBP 3.50 per megawatt-hour to wholesale electricity prices in the UK. To halt this gravy train for polluting power companies, their allocations of allowances would have to be cut by two-thirds, IPA concludes.[95]

At present, the EU ETS is unlikely to do anything for the climate other than affect the timing of the transition to more gas generation capacity. (Gas-fired power is less carbon-intensive than coal, although still a 'sunset' industry, since it too will have to be phased out soon.) By 2015, IPA suggests, 'the UK's electricity system will look remarkably similar regardless of assumptions on how the EU ETS plays out'.[96]

In fact, the EU ETS is rendering even the switch to gas doubtful. Uncertainty about how many allowances will be available in the future – resulting, again, from EU governments' policy of leaving decisions on allocations largely to a process of corporate rent-seeking – combined with current high gas prices, is causing utilities to delay investment in gas rather than coal. And if the government doesn't give out even more free rights to the global carbon dump to new entrants in the industry, then investment in new plant will be further deferred, raising emissions even more.

All in all, the EU ETS is likely to have helped *delay* reductions in annual UK power sector emissions to anything below 120 million tonnes of carbon dioxide for 15 years, just as the RECLAIM and lead trading schemes slowed pollution control in the US.

It may be slowing action on climate change in other sectors as well. In all member states except The Netherlands, governments withdraw companies' pollution permits if they close dirty plants. This creates an incentive to keep such installations open. Yet continuing to grant such companies pollution rights after they close such plants would hardly make their competitors happy.[97] The large cement firm Holcim complains that large emitters are not being given incentives to invest in more efficient installations.[98] Dutch nitric acid plant operators have meanwhile made it known that they want to delay making cuts in their nitrous oxide emissions in order to be in a better position to gain from the EU ETS from 2008.[99]

The practical outcome of the EU ETS is so clearly the opposite of what was advertised that even financial analysts state baldly that the 'competitive advantages' bestowed by handouts of assets under the EU Emissions Trading System simply 'cannot be justified from a climate policy point of view.'[100] As Citigroup Smith Barney and other analysts predicted as early as 2003,[101] governments are beginning to

have to think about stepping in to prevent the EU ETS from handing out enormous windfalls to the worst polluters. Even the investment bank UBS Warburg – not normally noted for its environmentalist enthusiasms – has questioned the wisdom of providing a multi-billion-dollar windfall to EU energy utilities, asking 'whatever happened to the principle of "polluter pays"?'[102] In May 2006, Tony Ward, energy director at Ernst and Young, stated flatly that the EU ETS 'has not encouraged meaningful investment in carbon-reducing technologies'.[103]

Unfortunately, this is only the beginning of the contradictions that result from the attempt to traffic in property rights to carbon dumps.

Uh-oh. What else is there?

A question of quantification

One of the most difficult problems is measurement. Property rights require quantification. Land titles require that territory be demarcated, mapped and surveyed. Fishing quotas require that catches be monitored and populations checked. Broadcast spectrum rights presuppose the ability to quantify frequencies, and permits to dump hazardous chemicals won't work unless the authorities are strict about amounts.

That's why, as Yale University property specialist Carol Rose points out, it is only recent '[g]overnmental advances in measurement, record-keeping, and legal enforcement' that have made possible the 'dramatic turn in the "propertisation" of what might seem to be "unownable" diffuse resources or *res communes* in the tangible world'. And it is this 'propertisation' that has enabled the rise of tradable pollution permit systems.[104]

For instance, the US sulphur dioxide trading scheme on which the Kyoto Protocol is based, as Daniel Cole of Indiana University has pointed out, would never have been possible before particular bits of high-tech measuring equipment called continuous emissions monitoring systems came into existence in the 1980s and 1990s.

The problem is that the fad for tradable permit systems has now far outstripped measurement ability, at least as far as greenhouse gases go. The level of quantification technology that made the sulphur dioxide programme in the US possible isn't available for greenhouse gases. Here again, the US model should have provided more discouragement than encouragement to the project to frame a market-oriented Kyoto Protocol.

What do you mean?

If the US can offer any model at all for pollution control schemes relevant to global warming, it should not be the 1990 Act which launched the sulphur dioxide trading programme, but rather the original US Clean Air Act of 1970.

Although the theory of tradable permits had been formulated by the late 1960s, the US's pioneer 1970 Act had no provisions for pollution trading. And it was a good thing that it didn't, at least with respect to sulphur dioxide. In 1970, there would have been no way of making a sulphur dioxide market work, because at the time there was no way of measuring how much sulphur dioxide each firm was releasing at any particular time. As one specialist noted, 'emission measurement technology is presently inadequate to meet the requirement that a regulatory agency be able to determine with some precision just how much an individual polluter is contributing to the atmospheric burden'.[105] In 1970, there were only 86 ambient sulphur dioxide monitors in the entire US, and those were only crudely accurate.[106] Monitoring at the point of emission was in an even more primitive state.

But that means there would have been no way of either verifying independently what each firm's original emissions level was or monitoring emissions afterwards to find out how much they were exceeding or falling short of their quotas.

Exactly. And even if firms had been allocated quotas, they would have had no means of finding out whether their emissions were in line with them, nor any incentive to do so. So there would have been no point in allocating different amounts of atmospheric 'dump space' to each firm to put its sulphur dioxide emissions in.

Still less would there have been any ability or incentive on the part of firms buying quotas to verify what they were buying. As David Driesen notes,

> Polluters purchasing emissions allowances have no interest in the quality of the goods. Buyers of blue jeans care about whether they wear out; buyers of pollution reduction credits only care about whether regulators will accept them in lieu of local compliance.[107]

In short, debits, credits and trading would have been impossible at the time – as would have been taxes.

How did the 1970 law reduce emissions, then?

The 1970 Act worked only because it took a different, directly regulatory approach. Instead of trying to monitor each firm's emissions,

it insisted that each firm install technology of a certain standard. As long as each firm did so, the government could be assured that some emissions reductions were being made, even if it could not precisely measure them, because officials could easily visit each installation and see whether the right technology was in place. In the early 1970s, for instance, the Los Angeles County Air Pollution Control District managed to inspect the technology at every major source once a month, at a time when it would not have been possible for it to monitor point-source emissions for all regulated pollutants at finite cost.[108]

Pollution trading theorists might assume that this approach was necessarily less efficient in achieving the Act's goals than trading would have been. But, in context, it was *more* efficient, given the state of pollution measurement at the time.[109] Trying to trade would have been, in effect, infinitely costly, due to the lack of the necessary measurement technology.[110] With technology-based regulation, on the other hand, the technology itself was the monitoring device. As Michael T. Maloney and Bruce Yandle explain, 'If the approved technique was in place, and working order documented, emission control was being accomplished.'[111] Similarly, the Corporate Average Fuel Economy regulation enacted by the US Congress in 1975, which doubled auto efficiency, did not prove either 'costly, inefficient or unsafe'.[112]

This points up a general lesson summarised by Daniel Cole: '[The] comparative efficiency of alternative environmental instruments cannot be determined in isolation from the institutional and technological circumstances in which they operate.'[113] Trading systems are 'quantification-heavy'. They can't reduce the costs of achieving an emissions reduction goal except in the presence of an extensive, far-

Oil extraction in the US.

reaching, uniform and accurate system of measurement and monitoring. Although, as Marc Roberts observes, '[w]hen economists discuss such matters as emissions trading they sometimes talk as if monitoring devices were widely available to cheaply and reliably record the amount of all pollution emissions',[114] such devices can't be taken for granted. If they are not available, giving polluters pollution quotas makes little sense.

So this is one of those cases in which emissions trading would have been inefficient, not efficient.

Yes. Although measurement technologies improved (there were six times as many ambient concentration monitors in 1977 as in 1970, and they were more reliable), they weren't good enough or cheap enough to support an efficient trading system (or taxes) until much later. The first continuous emissions monitoring systems (CEMs) became available only in 1975, and it was only the succeeding two decades of further technological development that made sulphur dioxide trading possible in the 1990s. Today, CEMs used by major SO_2 sources are capable of collecting data every fifteen minutes, and real-time data from every plant are sent via computer to Environmental Protection Agency headquarters in Washington.[115] The whole process is fully automated, minimising opportunities for cheating. On-site inspections are also made periodically.[116]

In sum, the sulphur dioxide market was less a matter of Congress suddenly grasping the economic theory of tradeable permits than of a change in the technological and institutional conditions that made a market possible.[117]

With respect to measurement of production and absorption of carbon dioxide and other greenhouse gases, the United Nations today is in a position similar to that the US was in 1970 with sulphur dioxide – only worse.

Like Marc Roberts's naïve economic theorists, the framers of the Kyoto Protocol 'simply presumed that a trading system would provide a lower cost mechanism than traditional command and control for meeting the Protocol's goal'[118] without looking carefully at whether the conditions for such a market – and thus for such savings – existed. As quickly became clear, the measurement systems required for the Kyoto market were simply not there.

In fact, the prospects of a quantification system robust enough to support property rights in a market are even less promising for the Kyoto Protocol than they were for a sulphur dioxide trading system in the US in 1970.

Why?

With respect to trading in emissions themselves, the problem is deficient direct pollution measurement and monitoring systems. Many countries – and not just Southern countries – lack the technical and institutional capability to quantify and monitor industrial greenhouse gas emissions precisely and regularly. Uncertainties about the quantity of greenhouse gases being emitted by national energy systems 'are in the range of plus or minus 10–30 per cent,' according to one survey.[119] Another survey puts uncertainties about overall greenhouse gas emissions in selected industrialised countries between 4 to 21 per cent.[120] Either figure is inadequate for the purpose of detecting the small reduction signal needed to demonstrate compliance with Kyoto. IPCC country inventory guidelines calculate that uncertainties come to 10 per cent for electricity generation, 10 per cent for industrial processes including cement and fertiliser production and 60 per cent for land-use change and forestry. For methane, the figures are even higher: 100 per cent for biomass burning, 60 per cent for oil and natural gas activities, 60 per cent for coal-mining and handling, and greater than 60 per cent for rice cultivation, waste, animals and animal waste. For nitrogen dioxide, they are 50 per cent for industrial processes, 100 per cent for biomass burning, and two orders of magnitude for agricultural soils.[121] In 2004, one author foresaw a ten-year delay prior to the establishment of adequate biotic carbon national monitoring systems in industrialised countries such as the US.[122]

In addition, in most countries, data on industrial emissions is provided by polluting companies themselves, not by an impartial authority, often calling the figures into question. In Los Angeles's RECLAIM scheme, companies' widespread use of emission factors developed by the Western States Petroleum Association instead of measurements of actual emissions allowed margins of error in reporting ranging from 50–100 per cent. Oil companies underreported their tanker emissions by factors between 10 and 1000[123] – one of several problems with the programme discovered only through a time-consuming investigation by an NGO, Communities for a Better Environment.[124] In March 2002, Anne Scholtz, architect of RECLAIM and Chief Executive Officer of the emissions broker ACE, was issued citations for filing false trading reports.[125]

In England and Wales, the Integrated Pollution Prevention and Control System that monitors and controls industrial emissions relies heavily on emitters taking samples of their emissions and reporting the results to the British Environment Agency. A report from the Agency suggested that 40 per cent of sites did not have satisfactory monitoring procedures in place. Yet from 2001 to 2005, the level of independent

monitoring of industrial sites' emissions dropped by three-quarters.[126] California's Environmental Protection Agency noted in late 2005, meanwhile, that the state simply did not yet have the 'accurate inventory of greenhouse gas emissions' required for a cap-and-trade programme.[127] BP, for its part, has acknowledged an uncertainty of 30–40 per cent in the 1990 baseline it uses in determining whether it has reached the 10 per cent reduction target of its in-house emissions trading programme, and the margin of uncertainty of its operations' current emissions, it admits, is still 5 per cent.[128]

Trading expert Ruth Greenspan Bell of the Washington think tank Resources for the Future observes that 'many highly industrialised countries such as China, Russia, and many of the other countries of the former Soviet Bloc do not have adequate monitoring equipment to detect what pollutants, and in what amounts, particular factories and power plants are releasing into the atmosphere. They have weak environmental enforcement systems and cannot really say whether particular plants comply with environmental requirements.'[129] Southern countries, Greenspan Bell says, are 'not the right places to insert theories that have only been tested in models and in the minds of the people who thought of them, where confounding facts and poor conditions can be assumed away.'[130]

Also, there are more carbon dioxide sources to watch over than there ever were sulphur dioxide sources, aren't there?

A lot more.[131] So many more, in fact, that one businessman with successful experience in brokering US sulphur dioxide trading allotments, John Henry, Chief Executive Officer of Power Navigator in Washington, DC, is concerned that international carbon trading – given the lack of ability to monitor so many source points and the absence of a national regulatory enforcement mechanism – will 'give the mechanism of emissions trading a bad name.'[132] In the US alone, hundreds of thousands of industrial sources would have to be monitored in a comprehensive carbon trading system, compared to a few thousand in the sulphur dioxide programme.[133]

'This is not a problem that will be solved like acid rain,' agrees Phil Clapp of the US National Environmental Trust. 'Acid rain dealt with a specific number of facilities in one industry that was already regulated…Global warming is not an issue that will be resolved by the passage of one statute. This is nothing short of the beginning of an effort to transform the world energy economy.'[134]

Technicians' ability to measure releases from the millions of biotic sources scattered over the surface of the planet is also constantly being

called into question. One recent example of many is the unexpected discovery in 2005 that the carbon content of British soils has been dropping steeply since 1978. Annual releases, scientists were surprised to find, were higher than the entire reduction in greenhouse gas emissions the UK has achieved between 1990 and 2002 as part of its commitment to the Kyoto Protocol – some 12.7 million tonnes annually.[135]

And it's not only carbon dioxide that needs to be measured, is it?

No, and that makes measurement even harder for schemes that have to measure half a dozen greenhouse gases at once. Each gas affects the climate in different ways, to different degrees, for different time periods. Although scientists try to aggregate all the gases into one omnibus category of 'carbon dioxide equivalent', their noncomparability is widely acknowledged. The lack of an adequate measurement system can only exacerbate the opportunities for cheating that are already inherent in emissions trading systems, where both buyers and sellers have strong incentives to conceal whether reductions have actually been made.

Some of these problems might be avoided with an 'upstream' rather than a 'downstream' system of monitoring – that is, one that measured the amounts of fossil fuels coming out of the ground rather than the amounts being burned.[136] And measurement technology is bound to improve over time. But there is 'no reason to expect that countries will reduce their greenhouse gas emissions to comply with quotas that cannot be effectively monitored and enforced'.[137]

That seems a decisive objection to greenhouse gas emissions trading of any kind. But if specialists in the IPCC and elsewhere knew about this, why didn't the message get across in the UN and the EU? And how could the US be so cynical as to cite its own permit trading systems as models for the Kyoto Protocol?

These are important questions, and ones that should perhaps be subjects of a special inquiry. The answers aren't completely clear, although the phrase 'wishful thinking' comes to mind, along with less charitable expressions. As in every aspect of carbon trading, the tail of free-market ideology is wagging the dog of science, political common sense, and technical possibility.

Still, isn't it true that if *we could put the necessary measuring instruments and bureaucracies in place, emissions trading* could *help reduce greenhouse gas emissions more efficiently? Isn't the US sulphur dioxide programme regarded as having saved money and been more efficient than conventional regulation?*

Yes. But that brings up a difficulty best dealt with in the next section – the meaning and value of 'efficiency' when set against the need for effective strategies to reduce and ultimately halt the use of fossil fuels.

Emissions trading vs. structural change

Carbon trading is often said to be a 'more efficient' way of reaching environmental goals. The trouble with terms like 'more efficient', though, is that they're vague. Efficient in what? And for whom?

Well, efficient in providing good things for all of us, no?

That's the theory. But you have to go through a lot of steps to get there, and each of those steps can be challenged.

For example, in the US sulphur dioxide case, most experts say with some confidence that trading saved the energy sector money, or ought to have done. To reformulate the example from the last chapter, a utility in North Carolina might use coal with a pound of sulphur in each tonne, and one in Indiana coal with three times that amount. So a scrubber installed at the Indiana plant would remove a lot more sulphur per dollar invested than the same scrubber in North Carolina. It might cost the North Carolina company USD 300 to collect a ton of sulphur, but the Indiana generator only USD 100. As a result, the Indiana operation could sell its North Carolina counterpart allowances at USD 200 per tonne, making USD 100 for itself and at the same time saving its sister plant USD 100. In this way, US sulphur dioxide trading, together with emissions banking, is widely held to have halved the cost of keeping emissions down to the target 9 million tonne level,[138] a saving of many billions of dollars for the firms involved.

In reality, it's unlikely that trading and banking alone made this saving. Emissions were already falling during the decade before the programme began. Twenty per cent of the emissions reductions often said to be due to the trading scheme were in fact achieved between 1980 and 1990, before it began,[139] and were due to such factors as increased availability of low sulphur coal and a shift of population toward areas in which it was easily available. In addition, a number of experts argue that it was factors such as the ability to take advantage of fuel-switching technologies, the fortuitous drop in prices of low sulphur coal in many areas since 1985 due to lower rail shipping costs, and the similarly fortuitous

elimination of a legal requirement for redundant scrubbers, that were the main source of subsequent cost reductions.[140]

In the late 1980s, too, officials and experts had often overestimated the cost of cutting future emissions, which made a lot of what happened afterwards seem like a 'saving' even if it wasn't. The American Electric Power Company assumed in 1981 that scrubbers would cost USD 500 per tonne of sulphur dioxide removed. The Tennessee Valley Authority thought USD 155 was closer to the mark; the department of energy USD 153–273, the Office of Technology Assessment USD 116–313. Most estimates didn't anticipate the historical accident of cheaper coal from the Powder River area.[141] As economist Dallas Burtraw points out, this price reduction, together with fuel switching cost reductions and other such factors that 'have caused marginal abatement costs to fall would also have lowered the costs of achieving the SO_2 emissions cap via some form of command and control policies'.[142]

Once the trading scheme got under way, in addition, a lot of installations managed to cut emissions without trading at all. Most of those who did trade traded only within their own firm. Inter-firm trading amounted to only two per cent of total emissions.[143]

But no one denies that emissions trading did save the private sector at least some money, right?

No, that's fairly uncontroversial. The question is what the impacts were on others – and on society and its environment in the long term.

What do you mean? Surely if the programme saved energy producers money, then everybody who used electricity benefited. Society as a whole was enabled to produce goods more efficiently, no?

It's not so simple. Sure, such schemes save specific companies money. And in doing so they are supposed to maximise what the grandfather of emissions trading, Ronald Coase, called 'total product' (read GDP), and thereby benefit society as a whole (see Chapter 2).

But they do so only by lumping together emissions with other economic goods. For a Coasean economist, the ability of the earth to keep temperatures within liveable limits has to find a market value just like wheat or silver. It must be translated into an 'abstract', calculable, alienable form that can live what globalisation guru Hernando de Soto pictures as an 'invisible, parallel life'[144] alongside its physical existence.

Thus creating 'efficiencies' in emissions reductions, like creating most other 'efficiencies', is a political process of morphing apples and

oranges into a single new fruit. In the case of carbon dumps, this becomes possible only by misreading the radical uncertainties, scales and irreversibilities connected with the climate system and confusing survival with economic benefit (see Chapter 1). As a result, it's going to be harder to make sense of using greenhouse gas emissions trading to create 'efficiencies' in abating climate change, even under ideal conditions, than it was to make sense of using sulphur dioxide trading to create 'efficiencies' in attaining a given numerical emissions target.

Emissions trading becomes 'efficient' in addition, only by commensurating emissions at one place or time with emissions at another place or time, shifting emissions cuts around over a wide area and extended time period so that they can be made wherever and whenever they are cheapest. It makes one place equivalent to another place and one time equivalent to another time.

So? What's the problem? That's a virtue, isn't it? The earth's carbon dump straddles all political and geographical borders. The atmosphere is constantly mixing on a global scale. Whether you cut emissions in Tomsk or Toledo, the atmospheric results are the same. Assuming we can perform the measurements, emissions trading is one way of recognising this reality. The climate doesn't care where we make our cuts, as long as we make them.

No, actually, that's wrong. It does matter to the climate where cuts are made.

What are you talking about? A one-tonne CO_2 cut in Tomsk has the same climatic effect as a one-tonne CO_2 cut in Toledo. A tonne is a tonne is a tonne. That's just basic science, isn't it?

Of course. But widen your vision a bit. Doing what is necessary to cut one tonne in Tomsk tomorrow may result in different *future* emissions than doing what is necessary to cut one tonne in Toledo tomorrow. The cut made in Tomsk may be the result of a radical new renewable energy technology or way of organising social life that will lead to vastly multiplied future cuts, whereas the equal cut made in Toledo may be a routine efficiency improvement that should have been made long ago and leads to nothing else. Where – and when – cuts are made is likely to have knock-on effects. How cuts are made now will have an influence on how much can be cut in the future.

Precisely because it treats all one-tonne cuts as the same no matter where and how they occur, and results in the cheapest cuts being made first, emissions trading runs the risk of delaying progress in dealing with global warming. Instead of encouraging the type of

Not All Emissions are the Same

If not all cuts in carbon dioxide emissions are technologically the same (see main text), neither are they the same politically.

Sunita Narain and the late Anil Agarwal of India's Centre for Science and Environment are famous for the distinction they made in the early 1990s between 'survival emissions' – what people emit to subsist – and 'luxury emissions'.

Centre for Science and Environment

Trading away a society's 'survival CO_2' – if that ever became possible in a carbon market – would be politically different from trading away its 'luxury CO_2', even if, tonne for tonne, the carbon market assigned both the same price. And that difference would have climatic effects if it translated into political conflict and the failure of official programmes for tackling global warming.

The distinction is analogous to that between 'survival water' and 'luxury water'. One reason water privatisation has failed in countries such as Bolivia, Tanzania, the US and the Philippines is that the water market, in aggregating all water across different locations and contexts, makes no distinction between the two. When the water ordinary people need to pursue a dignified and healthy life is priced out of their reach, they resist.

A privatisation of the world's carbon-cycling capacity that set survival emissions equivalent to luxury emissions would have the same shortcoming.

innovations, long-term investments and broad restructuring that are crucial to speeding the transition to a society that doesn't use fossil fuels, it discourages them in favour of scattered stopgap measures that may ultimately be very costly. 'Optimising components in isolation', in the words of energy experts Amory Lovins and colleagues, 'tends to pessimise the whole system – and hence the bottom line'.[145]

This is another case in which what is typically called 'efficiency' is not *effective*.

Emissions trading and innovation

That doesn't make any sense to me at all. What you're saying seems to go against what economics teaches us: that markets give people incentives to invent useful things so they can make money.

Say what you like about the problems of emissions trading, the great achievement of projects like the Kyoto Protocol and the EU Emissions Trading Scheme is that they have given carbon a price. Maybe the measurements can't be made

yet, maybe no one agrees yet on who owns the rights, maybe big polluters are still being rewarded, maybe the price isn't high enough yet, maybe there are all sorts of other problems. But at least having a price is better than having no price, isn't it? Emissions trading promises to make it impossible for a lot of people to release greenhouse gases for free, or use the world's carbon dump as if it had no value.

Having to pay a price gives industry a new incentive to clean up and stop using so much fossil fuel. The more allowances that industry has to pay for, the more it will need to shift toward more efficient, renewable and low-carbon technologies, which will direct more capital toward green energy suppliers and creative technology development. The result, as the EC says, is to promote 'global innovation to combat climate change'.[146]

Markets in pollution allowances also spurs innovation by providing polluters with incentives to compete to do even better than they are required to do by law. Sure, conventional regulation can force the private sector to improve technology. But trading encourages even more change, since companies can make money by 'overshooting' the minimum requirement and selling the resulting credits to firms less willing or able to reduce emissions or banking them for their own future use.[147] *How can emissions trading be slowing down action on global warming?*

There are all sorts of problems with this argument. But let's start with the idea that giving carbon a price is a royal road to structural change in energy use.

You're right that prices can provide incentives for change. In fact, there are plenty of ways that, under better regulatory systems, prices could lead to more efficient uses of energy *without* carbon trading schemes. This is particularly true in highly energy-wasteful countries such as the US. Indeed, according to many analysts, even after a century of entrenchment of carbon-intensive technologies in the US, non-carbon or reduced-carbon energy generally lowers costs rather than raising them, for corporations, consumers and countries alike.[148] Similarly, according to the Intergovernmental Panel on Climate Change's (IPCC's) conservative Working Group III, using known and currently available technologies could reduce global greenhouse emissions below year 2000 levels by 2010 at zero net costs, with at least half of this achievable at a profit.[149]

But the question here is whether emissions trading schemes, particularly as they are currently designed, add any incentives for the particular kinds of change most needed to combat global warming. Are they, as many governments, businesses and large environmental NGOs claim, the 'best option for the world to make a transition to a low-carbon economy'?[150]

One problem is that while emissions trading provides financial incentives for *some* polluters to seek ways of reducing emissions, it simultaneously provides financial incentives for *other* polluters *not* to reduce emissions. That is, it gives incentives to industries that can make pollution-reducing technological changes cheaply and easily to make the most of their advantage, but also gives incentives to industries that find it harder and more expensive to make such changes to cut emissions *less* than they would have to do under conventional regulation.[151]

The overall effect is to discriminate against costlier types of innovation. What's more, rational sellers will not bother to generate credits unless they cost less to produce than prospective buyers have to lay out in pollution control, and are also competitive with credits produced by other sellers.[152] Emissions trading provides 'equal measure of under-compliance and over-compliance incentives, inducing less innovation than a performance-based standard to which everyone has an incentive to comply.'[153]

But in most pollution trading systems, the number of available permits is supposed to be gradually ratcheted down over time, isn't it? As allowances become scarcer and the price goes up, so do incentives for companies to reduce pollution themselves rather than buy credits from others. So eventually there are incentives to undertake more expensive or difficult types of technological change.

That's right. However, the number of allowances available is not reduced by trading, but by the ratcheted-down 'cap' imposed by the state, sometimes through international agreement. Whatever environmental benefits result depend in the end not on trading but on government action: how strict a cap the government imposes, how strictly it ratchets it down, whether it is committed to continue challenging industry to make improvements, and so forth. The US sulphur dioxide trading scheme, for example, is 'no more than a technique to increase the economic efficiency of a classic command-and-control regulatory program'.[154]

OK, so trading favours cheaper kinds of innovation. What's wrong with that?

Whether anything's wrong with it depends what kind of change you need. What the climate crisis requires is the fastest, most radical cuts and the most sustainable and environmentally desirable results (see Chapter 1).

But will the prospect of having to spend a lot of money spur corporations to innovation of a more relevant sort than the prospect of having to spend little?

'Trading is nothing more than a tool to reach an independently established and enforced regulatory objective. Focusing only on the trade is like giving credit for a good haircut to the scissors rather than the barber… [C]redit for pollution reductions properly goes to the… cap, not the trade… The prevailing wisdom is that greenhouse gas emissions can be controlled by instituting an incentive system based on emissions trading, rather than focusing on regulatory basics. But this is a step entirely in the wrong direction.'[155]

Ruth Greenspan Bell, 2006

It's hard to generalise, but the old saw 'necessity is the mother of invention' suggests that it should. So does what economists call the 'induced innovation hypothesis', according to which the lower costs associated with pollution trading schemes should result in less innovation, not more.

Many policymakers and businesses are aware of this. In 2005, the leaders of two dozen of the world's most prominent corporations convened at a G8 Climate Change roundtable acknowledged openly that emissions trading schemes are 'less likely to stimulate major technological change or breakthroughs' than to promote mere 'efficiencies in energy use or manufacturing processes', and that other 'public and private sector programmes' were necessary to 'stimulate the development and commercialisation of new low carbon technologies'.[156]

What this means is that emissions trading may favour emissions reductions that are lower-cost and more 'efficient' over a short time yet militate against approaches that are 'efficient' over a longer period.

Could you give some examples?

Suppose a company can reduce carbon dioxide emissions by installing an end-of-pipe technology that requires an initial outlay of USD 100,000 and USD 1,000 a year in operational costs thereafter. But also suppose that for USD 200,000 the company could reengineer its whole industrial process in a way that cut back on its need for fossil fuels, generating a USD 1,000 in cost savings every year.

The more expensive solution would be better for the climate. Over the long term, it would also be more 'efficient'. The cumulative cost of the reengineering solution would decline over time, while that of the end-of-pipe solution would only increase. No matter how high the discount rate was set, the reengineering solution would at some point begin to save the company money.

Yet it would be companies that chose the end-of-pipe solution that would benefit most from an emissions trading system. They could sell allowances more cheaply during the first years of the market than companies that undertook reengineering. They would be the winners of the short-term 'efficiency' sweepstakes.[171]

In a sense, a whole multitude of non-carbon technologies, no matter how expensive, will in the long term prove more 'efficient' than carbon-intensive technologies – insofar as they help prevent a climate catastrophe. Yet emissions trading cannot select for this 'efficiency' over the conventional efficiencies enabled by short-term tweaks that merely reinforce an entrenched fossil fuel-intensive technological

Emissions Trading vs. Innovation: A Lesson Not Yet Learned

In the US, pollution trading schemes, with their bias toward cheaper reductions, have been unfriendly to more interesting, radical and sustainable types of technological change that require long-term, broad-ranging efforts.

Even the better-designed US pollution markets, while encouraging certain technological adjustments, have provided fewer incentives for fruitful innovation than, say, performance standard programmes of identical stringency with no trading. By lowering rather than raising the cost of obeying pollution laws, they have tended to take advantage of differences among technologies that already exist for a particular purpose more than to stimulate the development of new or more broadly effective technologies. They improve current state-of-the-art technology rather than lead to a new state of the art.

The US sulphur dioxide programme instituted in 1990, for instance, produced only one or two main technological responses. These involved old technologies. One was scrubbers – a standard end-of-pipe approach. The program did produce some innovations in scrubber design. But so had previous regulation, so these cannot be attributed to any special innovation-producing power of trading.[157] Another technological change was the wider use of low-sulphur coal. But in addition to not being a real innovation, this change probably came about as a result of railroad deregulation, not trading.[158]

The conclusions of Margaret Taylor of the Goldman School of Public Policy at the University of California, Berkeley and her colleagues are unambiguous:

'... the weight of evidence of the history of innovation in SO_2 control technology does not support the superiority of the 1990 Clean Air Act (CAA) – the world's biggest national experiment with emissions trading – as an inducement for environmental technological innovation, as compared with the effects of traditional environmental policy approaches… . In addition, traditional environmental policy instruments had supported innovation in alternative technologies, such as dry flue-gas desulphurisation (FGD) and sorbent injection systems, which the 1990 CAA provided a *disincentive* for, as they were not as cost-effective in meeting its provisions as low-sulphur coal combined with limited wet FGD application.'[159]

There was some tweaking of operating procedures – for instance, plants might run their less-polluting units more frequently than their highly-polluting units in order to generate saleable credits.[160] But there were no radical innovations addressed at, say, supplanting coal-fired capacity or reducing demand and no innovation in technologies such as wind turbines, or conservation programmes that can reduce many different pollutants simultaneously. What the market encouraged, at most, was shrewd use of existing technology to save money to meet an isolated standard for one substance, not the opening of new environmental horizons for society.[161]

The fact that the US's sulphur dioxide programme overshot its modest target in 1995 may seem to show that trading stimulated innovation. In fact, what happened was that companies wanted to 'bank' credits for future use in the next, more demanding phase of the programme.[162] Little trading was in

fact involved[163] and even less innovation. In addition, the overachievement was small in absolute terms. The US programme is expected to cut sulphur dioxide emissions by only about 35 per cent by its 20th anniversary in 2010. In contrast, Germany cut power plant emissions by 90 per cent from the first proposal in 1982 to completion of its programme in 1998, without trading.[164]

Trading does not seem to have encouraged the development of innovative technologies under the US's less well-designed pollution programmes, either. Southern California's RECLAIM market, for instance, appears to have sidelined the development of fuel cells, low-emitting burners and turbines, and so forth, whose development had previously been subsidised by a percentage of car registration fees. At least one innovative entrepreneur making low-NO_x burners, Alzeta, probably lost rather than gained sales as a result of the programme.[165] An emerging method of reducing NO_x, $SCONO_x$, was also thwarted. $SCONO_x$ is more expensive than the dominant selective catalytic reduction method, but arguably could have penetrated the market if there had been stringent regulation generating less 'spatial flexibility' about where reductions were made.

Innovations under the 'bubbles' of early US pollution trading programs also tended merely to be rearrangements of conventional technologies rather than the invention, development or commercialisation of the non-obvious technologies necessary for achieving a longer-term social or environmental goal.[166]

Similar lessons can be drawn from the internal system of emissions trading instituted in 2000 by the Anglo-American oil firm BP Amoco, which committed its business units collectively to shaving 10 per cent off their 1990s greenhouse gas emissions by 2010. (The emissions resulting from sales of the hydrocarbons the company extracted and refined were not counted, although they of course are hundreds of times greater than the firm's in-house releases.)[167]

BP Amoco's trading system did help the company make the easy one-third of the cuts required more cheaply. These cuts were mostly in obvious areas like process efficiencies – finding and shutting down spare turbine generators, minimising downtime by cleaning machinery without shutting it down, steam and power cogeneration, and so forth.

But in attempting to make the rest of the cuts, company divisions were able to avoid more radical change simply by looking 'outside [BP's] operations [to] see what can be done by working with others' – for example, by setting up cheap, low-tech, 'offsite carbon reduction' schemes like allegedly carbon dioxide-absorbing tree plantations in distant locations.[168] By 2002, the company expected half of its so-called 'emissions reductions' to come from credits bought in from outside.[169] At no point was there any move toward genuinely innovative technology.

regime. It fails to register the rising and ultimately overwhelming, but incalculable, costs of continued reliance on fossil fuels to all enterprise and indeed most livelihoods (see Chapter 1). Emissions trading may coax a bit more out of the fossil economy, but it is not going to help the world get past it.

Why is that?

Partly because of what is known as 'lock-in', or 'path-dependence.'

What's 'lock-in'?

A simple example is the order of letters on an English-language computer keyboard. From the upper left, the keyboard reads 'Q,W,E,R,T,Y'. The reason why the letters were put in this fairly awkward order is that when typewriters were first invented, the keys would often jam and it was advantageous to slow down the speed of typing. Of course, jamming keys are not a problem on modern computers. Yet despite the fact that the QWERTY letter order slows down typing, society is 'locked in' to using the system.

'We ought not reflexively to assume that the cheapest method is always the best method. For some environmental problems, we may want to give initially expensive technological transformation more priority than cost-effectiveness.'[170]

David M. Driesen, Syracuse University College of Law, 2006

An awkward letter arrangement on English-language keyboards has become too entrenched to change easily.

In general, technologies become 'locked in' when, for whatever reason, they gain a historical head start on other technologies and become entrenched in far-reaching technological, political and cultural webs. These webs give them the advantage of economies of scale, synergies with other industries, access to policymakers, accumulated specialist expertise, and subsidies of various kinds. Locked-in systems tend to be able to absorb or deflect incremental attempts to institute

'Locking in' Fossil Fuels in the US

The US is so thoroughly organised, technologically and politically, around a high level of fossil fuel use that even President George W. Bush has acknowledged an 'addiction' that needs to be 'broken.'

By triumphing in early political and cultural struggles, US fossil-dependent technologies got first crack at economies of scale; were able to begin building a base of skills, research and resources that guaranteed rapid development; managed to integrate themselves first into transport, production, consumption and other cultural systems, building up a rich web of new habits and lifestyles; starved competing technologies of research and resources; helped build and ensure demand; and ultimately won adherents in subsidy-providing state bureaucracies.

Petroleum-fuelled internal combustion engines, for instance, were considered the least promising source of automobile propulsion in 1885. But chance events such as the closing of horse troughs used to supply steam vehicles led one manufacturer to shift to petrol engines, providing a mass production base that drove prices down, improved performance, and locked in dominance.

At around the same time, alternating-current (AC) electricity technology, which allowed long-distance transmission and centralised generation close to large fossil-fuel sources, closed out more efficient direct-current technology because it won judicial, political and public relations battles and was more attractive to aspiring monopolists. AC's advantage then snowballed into technological and economic hegemony.

Through such processes, fossil fuels became 'locked in' to the US's transport and electricity generation sectors. Together, these sectors today account for approximately two-thirds of global carbon emissions.[174]

A set of subsidised structures engineered for high fossil fuel use – interstate highway systems, automobile industries, refineries, suburban sprawl, centralised power plants, supermarket-centred food systems and so forth – became inextricable from the livelihoods of millions of people, while a subsidised extraction network employing many more, ranging from military machines to lobbyists to university geology departments,[175] emerged to locate, secure and exploit fossil fuel fields around the world.[176]

It was only as a result of such political and social processes, which included far-reaching changes in both individual and societal goals, that it became possible to talk about fossil-fuelled technologies as cheaper or 'more efficient' than certain other alternatives. Orthodox economics hides this history.

In this situation, higher energy prices are more likely to spur a search for more oil and gas than a search for better sources of energy. And even though the search for more fossil fuels is likely to yield smaller and smaller returns, the market still won't provide enough incentives to lay the groundwork for structural change in the energy sector. On the other hand, if, in response to inflation, interest rates are put up and demand falls, the resulting drop in prices may well only lead to renewed consumption of fossil fuels.

'Lock-in' is one reason why addressing the climate crisis requires not just clever inventions that use carbon more efficiently or even get the carbon out of energy entirely, but also political movements that get energy companies out of fossil fuel deposits, Northern military establishments out of oil-rich regions, oil and car manufacturers' lobbyists out of positions of political power in Washington, and Northern agribusiness out of Southern lands needed for basic local requirements.

broader change because they constrain 'available' choices. 'Very seldom does optimising each component in isolation ... optimise the system as a whole'.[172] An inertia takes hold that is difficult to break.

Fossil fuel-based energy systems are no different. They weren't chosen because they were a rational, low-cost, efficient means of meeting pre-existing ends, but for other reasons (see box, above: Locking in Fossil Fuels in the US). 'Timing, strategy and historic circumstance, as much as optimality, determined the winner'[173] of the competition to determine what energy system would be used.

Lock-in is as much social as technological. In the UK, for instance, transport has become locked into what energy consultant Roger Levett describes as a complex 'vicious circle' involving habits and community structure as much as fuels and engines (see Figure 3).[177] Without this locked-in structure, Levett estimates that fuel use in the UK could be cut by 87 per cent and carbon-based fuels eliminated altogether using *existing* technologies. Similar assessments have come from the US and elsewhere.[178]

'Entrepreneurial discovery consists not in achieving efficiency in dealing with a given situation but in alertness to the possibility that the true situation (with respect to which efficiency would be worth pursuing) is in fact different from the situation that had been assumed to be given.'[180]

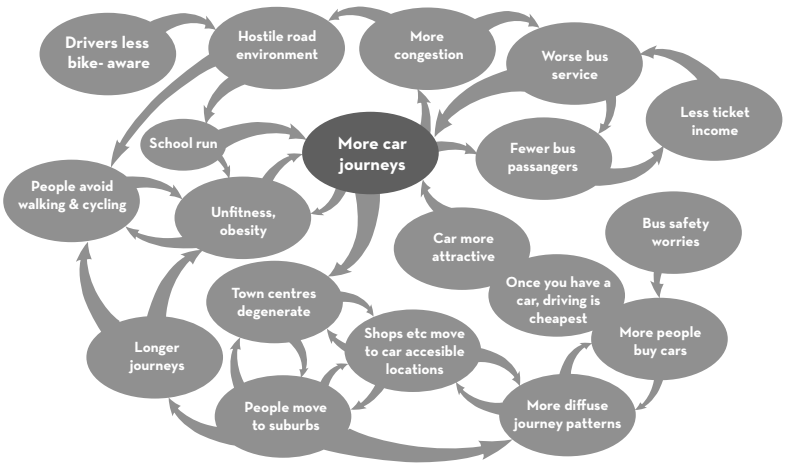
Israel M. Kirzner, 1985

In sum, 'locked-in' technologies and social structures – including fossil-dependent energy and transport systems – are likely to be difficult to change in the short term even when they were not originally adopted for efficiency reasons and are economic dead ends in the long term. Conversely, alternative technologies may be expensive or difficult to develop in the short term even when they promise to be cheaper in the long term; many success stories have failed early efficiency tests.[179]

Even when they can provide starting points toward restructuring society away from fossil fuel dependence, they are penalised by being deprived of economies of scale, synergies and political and cultural entrenchment. The economic calculations characteristic of emissions trading work best within a given social and technological regime, and don't provide good incentives for changing that regime.

Figure 3. A Vicious Circle in UK Transport

Source: Levett-Therivel Sustainability Consultants



But won't really steep price increases provide enough incentive for changing locked-in technologies?

Not if people are highly dependent on them and no clear alternatives are available. For example, because the 'current vehicle stock and the road infrastructure' in Northern countries 'makes individual car ownership and use very easy'[181] and because people still have to go to work, however much it costs, rising petrol prices may leave demand relatively unaffected. According to energy economist Philip Verleger, 'it would take a doubling of petrol prices to reduce American petrol consumption by just 5 per cent'.[182] Citizens in countries such as the US do use less energy when it grows more expensive, but that use changes very slowly.[183] The other side of this coin is popular protests against petrol price increases of the kind that have swept the UK and the US recently.

Beyond a certain point, systems analyst Gar Lipow suggests, commodity prices – including the prices of pollution permits – can't play much of a role in the North's transition to a lower-carbon economy. Public investment and regulation are needed to facilitate better individual choices:

> Look at the U.S. – where automobile efficiency more than doubled from around 14 to around 25 miles per gallon when [government] standards were imposed – then stopped rising when trade decisions, congressional actions, and light truck loopholes stalled standards.

> Again, look at home insulation in most states; generally average levels of attic insulation hover around the minimum state regulations require; a few people may get more, a few are [allowed to make do with] less; but within a few percentage points, regulatory minimums are a fair predictor of actual insulation. In European Union nations, regulation and public spending (especially on rail) are better predictors of carbon efficiency than price policies. Again, this is not to say that raising the price of energy does not reduce use; merely that regulation and public works do so more quickly, more efficiently and with fewer unintended consequences.[184]

In the EU ETS, prices for emissions allowances are currently being driven by increases in the price of natural gas, or, more fundamentally, the cost of shifting from coal to natural gas – and also by weather.[185] Even relatively high allowance prices can do little more than provide a moderate disincentive to shift from gas to coal in response to high gas prices. The UK firm Enviros says that even carbon permit prices of €50 per tonne are unlikely to 'provide the stimulus necessary' for firms to invest 'to drive down greenhouse gases'.[186]

One weakness of carbon permit prices as drivers of change is that they are likely to be 'extremely volatile because of the complete inelasticity of supply of permits' along with 'inelastic demand for permits in the short run'.[187] In the US, 'sulphur dioxide trading prices have varied from a low of USD 70 per ton in 1996 to USD 1500 per ton in late 2005. Sulphur dioxide allowances have a monthly volatility of 10 percent and an annual volatility of 43 percent over the last decade'. In Los Angeles's RECLAIM trading scheme, NO_x prices suddenly went through the roof in 2001 due to industry procrastination, a hot summer, and a cutoff of supplies of electricity purchased from out-of-state. The price of the right to emit one pound of nitrogen oxide zoomed from USD 0.13 in 1999 to USD 37 in July 2001, before settling back to USD 13 in September 2001.[188] In 2005 and 2006, EU ETS prices for carbon dioxide jiggled over a wide range between €7 and €30 before crashing to €9 in May 2006. According to Vincent de Rivaz, Chief Executive of EDF Energy in the UK, 'the long-term price of tradable emissions allowances is too uncertain to be a driver of systemic technological change in an industry whose generating capacity investments must be planned over 30-year periods'.[189]

Yale University economist William D. Nordhaus warns that such volatility might make trading 'extremely unpopular with market participants and economic policymakers' if it caused 'significant changes in inflation rates, energy prices, and import and export values'. An analogy would be the volatile prices associated with the 'peaking' of oil production, which are not expected to provide signals that could

Climate and the Price Signal

According to economists, prices send out 'signals'. But what exactly do they contribute to the conversation about climate change?

Prices are notorious for the strange things they say about irreversible events, unknowns and the long term. Even the most orthodox economists' estimates of the costs and benefits of doing something about global warming differ by many hundreds of billions of dollars per year, depending on variations in the assumptions plugged into conventional economic models.[192]

Sometimes prices are positively tongue-tied. 'The carbon market is not going to be able to put sustainable development and everything else into one price,' says Jack Cogen, president of Natsource, the largest private buyer of carbon credits. 'The carbon market doesn't care about sustainable development.'[193] Cogen's view is reinforced by many other carbon businesspeople, who acknowledge privately that their incipient market actually has little or nothing to do with climate.

There are other ways, too, in which prices tend to keep to themselves the information needed to make climate-friendly choices, even in as mundane a matter as home-buying. Says activist and systems analyst Gar Lipow:

'Levels of insulation that pay for themselves in four months to three years will seem a good deal when buying a house on a 30- or 15-year mortgage, given energy savings alone. But a problem arises when most homes don't offer that level of insulation. After all, there are more important considerations than energy costs. Is the house close to work, schools and shops? Also, there are the questions of layout, and appearance. If all homebuilders were required to offer this level of insulation they could easily recover their costs and a significant profit besides at a price that would still lower overall cost of ownership to buyers. But in the absence of regulation requiring this, homebuilders may offer homes without such features. So long as most homes don't offer them, they suffer little loss in bargaining power. The odds are homes with a similar location, layout and appearance won't be available with the added energy conservation features. Without regulation, builders rationally believe they won't gain enough bargaining power in selling their product to make extra insulation worth adding. This is so even though the buyer would get a good deal by paying enough for the added energy savings feature to allow the builder a significant extra profit.'[194]

stimulate the development of alternative liquid fuels in time. 'Waiting until world oil production peaks before taking crash program action leaves the world with a significant liquid fuel deficit for more than two decades', which would cause problems 'unlike any yet faced by modern industrial society,' according to one US study.[190]

Unless the groundwork for fundamental change is laid beforehand, corporations may simply not respond to high prices. They may redouble their pressure on the government not to reduce its allowance handouts. Or they may just pay the fines for not being able to find enough allowances to cover their emissions. In Los Angeles's RECLAIM programme, many polluters continued operating old equipment, didn't have enough allowances to cover the resulting pollution, and simply incurred multi-million dollar fines.[191] In the end, local government had to bring wayward electric generating facilities back under conventional regulation that allowed them to pay a fee per tonne rather than buy credits. Only then was catalytic reduction technology retrofitted into 17 generating facilities. With the trading programme in a shambles, no assessment of whether it had saved money was even attempted.

Emissions trading's blindness to the long term is also damaging in other ways. For example, emissions trading is incapable of taking account of the society-wide economic benefits that can result from letting stiff costs fall on heavily-polluting industrial sectors rather than allowing them to buy cheap pollution permits as a way out. Such costs can lead to savings associated with well-known side benefits of non-fossil technologies, such as relief from the damage caused by pollutants other than greenhouse gases, destruction of land due to oil drilling and coal mining, water pollution, and so forth, but also to innovations that lower the prices of products from cleaner competing sectors.[195] Michael Porter of Harvard Business School argues that innovations spurred by stringent environmental regulation that imposes extra costs in the short term may enhance competitiveness to a greater degree in the long term than merely maximising static efficiency, gaining access to cheaper inputs, or increasing scale.[196]

'Emissions trading does not stimulate competition to maximise environmental performance. It simply authorises some trading around of obligations the government has created.'[198]

David M. Driesen, 2003

What's more, individual and societal goals are themselves likely to change as costs come down as a result of new technological and social patterns becoming 'locked in'.[197] That could mean less demand for the things that today only fossil fuels can provide. Such a shift in goals is unlikely to occur within the previous locked-in fossil-dependent system. Again, emissions trading can't help select for it.

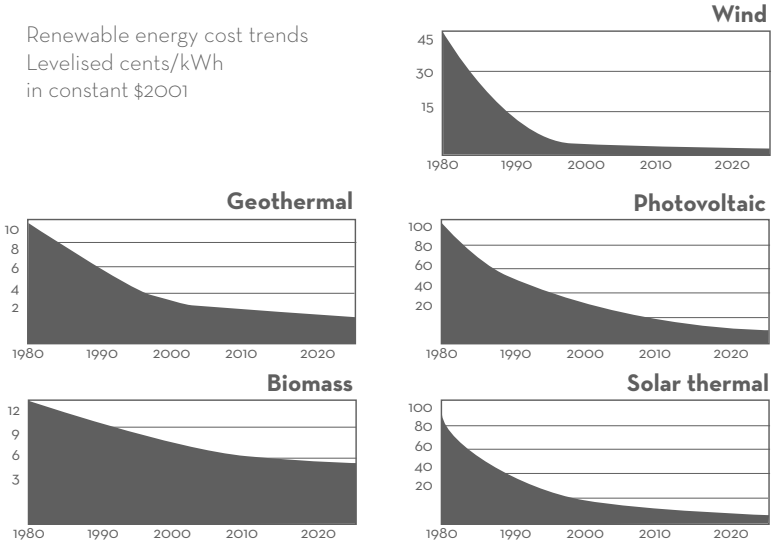
It sounds as if environmentally superior technologies such as solar power are not going to benefit much from emissions trading.

No. Emissions trading might even slow down their development. Once produced on a large enough scale, photovoltaics would become a far cheaper source of electricity per unit cost than fossil-fuelled technologies,[199] and cheaper still if other parts of the technological and political context were changed – if subsidies were shifted from nuclear

power, for instance. Already, costs of various types of non-fossil energy technology are declining. (See Figure 4.) But without opportunities to get 'locked-in' through more state-backed research, public investment, economies of scale, and other processes, solar power is still too expensive to get much of a boost from emissions trading.

Figure 4. Renewable Energy Cost Trends, US

Source: Rocky Mountain Institute



So there's no way around it. Emissions markets are structurally biased against the kind of radical change needed to tackle global warming.

That's certainly what the evidence suggests. As the Heinrich Böll Foundation's *Jo'Burg Memo* observes,

> [T]he 'polluter pays' principle has been turned into a 'polluter buys his way out' principle. Decarbonisation will not really take place in this manner, since the resource base of Northern economies is not being restructured.[200]

To sum up the story so far, while trading schemes can in theory

- save *participating private firms* money in
- reducing emissions of *specific substances*
- to a *particular degree*
- over *particular time periods* and
- within a *particular larger technological system*,

the same schemes are unlikely to be the best choice if the objective is to

- save money for *society or industry as a whole*, or
- attain a more *general environmental improvement*, or
- make *more drastic reductions*
- with *long-term* goals in mind, or
- bring about a *change in a larger technological system*.

When trading advocates assert that trading systems are 'cost-effective' without specifying for whom, in what, and over what time period, they're being so vague that they court irrelevance.[201]

But maybe in helping private firms save money on incremental improvements in carbon-intensive technology, emissions trading can help buy time for the research and development that is needed to shift industrialised societies away from dependence on fossil fuels entirely. Maybe the market can help make the world's fossil fuel technologies state-of-the-art, or moderate their climatic effects, while solar and other renewable technologies are being developed to replace them.

There are several problems with this argument. First, shifts in technological and industrial structure don't just happen on their own. Solar energy technology, for example, is not 'advancing' busily by itself in a bubble independent of politics, funding and society. Its developers struggle continually to develop a network of research and investment against a structure of large competing subsidies and other encouragement still being given to fossil or nuclear energy and other arguably 'sunset' technologies. A shift in this pattern of support won't be delivered by emissions trading.

Second, emissions trading schemes, even the better-designed ones, rather than buying time for governments or corporations to make structural changes, actually slow or block many technological developments by squandering ingenuity and resources on making small refinements that extend the life of an overwhelmingly fossil-oriented energy and transport structure. And in doing so, they make it more likely that

'Greenhouse gas emissions from aircraft, increasingly implicated in climate change, will continue to grow even if the airlines join Europe's emissions trading scheme, which is designed to cut them, British Airways' chief economist admitted yesterday.'[204]

News item, London Independent, 2006

Does Emissions Trading Reward Efficient Actors?

Emissions trading can help big polluters save short-term emissions-reduction costs. But does it reward companies and countries that are already more efficient, even by conventional standards? Not so far.

Under the EU Emissions Trading Scheme, global public assets which presumably should be used to foster the fastest transition to a non-fossil energy regime worldwide are being handed to the biggest carbon emitters in the most carbon-intensive countries.

So far, these big polluters have responded to the scheme mainly by lobbying for more emissions permits or more advantageous ways of distributing them within their sectors; by massaging baseline figures; by seeking carbon credits from abroad that will help them evade structural change; by looking more closely at gas; and by passing on any costs to customers.

The Kyoto Protocol, meanwhile, awards the most emissions rights per capita to countries that are, even by very conventional economic yardsticks, relatively *in*efficient users of energy.

Australia, for example, is one of the most 'carbon-inefficient' countries in the world. It ranks 109th among 141 nations in its carbon efficiency, or ratio of tonnes of carbon dioxide emitted per US dollar of GDP. Yet under the Kyoto Protocol, Australia, had it signed the treaty, would have been generously granted emissions rights amounting to around 27 tonnes per capita. Other notably carbon-inefficient countries (the Czech Republic, ranked 115th; the US, ranked 100th; Canada, ranked 98th; Finland, ranked 80th; The Netherlands, ranked 78th; Germany, ranked 76th; the UK, ranked 74th) get rights to between approximately 10–17 tonnes of carbon dioxide equivalent per capita.

At the same time, the world's most carbon-efficient countries (including Namibia, the Lao PDR, Nepal and Bangladesh, ranked 1st, 5th, 18th and 23rd respectively) receive zero tradable rights under the Protocol. Sweden, a moderately carbon-efficient nation (ranked 42nd out of 141), gets only about seven tonnes per capita, around the same as Japan and Spain, ranked 61st and 62nd (see Table 3, next page).[207]

when governments such as that of the US are finally panicked into taking action on global warming, they will grasp at extreme, technical-fix solutions such as creating new life forms to produce hydrogen, re-engineer hurricane-prone seas, or absorb carbon dioxide; seeding the oceans with nanoparticles to promote plant growth; dispersing nanoparticles in the upper atmosphere to reflect light; or putting continent-sized mirrors into space (see Chapter 2).[202]

Third, far from being a quick 'stopgap solution' that can be applied immediately while more difficult measures are prepared, emissions trading is the 'most difficult of the economic instruments'[203] available for environmental protection, and requires an enormous amount of legal, institutional and technological stage-setting to get off the ground, even in a country like the US.

Table 3. 'Carbon-Efficient' and 'Carbon-Inefficient' Nations

Country	Carbon Efficiency (Tonnes of CO_2 Emissions per US Dollar of GDP)	Carbon Efficiency Rank among 141 Nations
Namibia	0.00	1
Lao PDR	0.14	5
Nepal	0.30	18
Bangladesh	0.36	23
Sweden	0.70	42
Brazil	0.71	43
Norway	0.74	45
Philippines	0.77	47
France	0.78	48
Italy	0.91	57
Spain	1.00	61
Japan	1.00	62
Denmark	1.08	66
Indonesia	1.11	69
UK	1.17	74
NZ	1.19	75
Germany	1.19	76
Netherlands	1.23	78
Finland	1.28	80
India	1.35	85
Egypt	1.45	86
South Korea	1.51	94
Canada	1.69	98
US	1.77	100
China	2.03	107
Australia	2.07	109
Czech R.	2.43	115
South Africa	2.56	119
Saudi Arabia	3.60	129

The Carbon Market as Epicycle

From about the second century onward, the European astronomical model that placed the earth at the centre of the universe had to add more and more squiggles and refinements ('epicycles') in order to account for observations of planetary movements. Only in the 16th century was the whole complex model and all its epicycles finally abandoned in favour of a simpler and more elegant sun-centred model.

The carbon market is like one of the epicycles added to the earth-centred model to preserve it. It helps keeps the obsolete fossil-centred industrial model going at a time when society should already be abandoning it.

No empirical evidence exists that current greenhouse gas trading programmes are functioning as transitional solutions on the way to a fossil carbon-free future. In fact, all the available evidence is on the other side. Major oil corporations such as BP and Shell, both enthusiastic initiators of internal trading schemes, have never voiced any serious intention to curb their main activities of oil exploration or production at any time. Although it has changed its name to 'Beyond Petroleum', BP committed itself in 2002 to expand its oil and gas output by 5.5 per cent per year over the succeeding five years. Its emissions in 2001 were equivalent to almost two years' carbon dioxide emissions from the UK.[205] The firm's investment in renewable energy remains at a mere 1 per cent of the USD 8 billion it spends on fossil fuel exploration and production every year.[206]

Similarly, the World Bank treats its carbon trading wing as what one prominent former staff member scathingly refers to as a mere 'epicycle'[208] of an overwhelmingly fossil-oriented approach to energy and transport.

Efficiency and hot spots

Karl Polanyi

There's another problem with the procedure of creating 'efficiencies' by spreading emissions cuts around so that the cheapest can be made first: it tends to harm the weak and benefit the powerful. That means there are going to be political limits – defined by popular resistance, among other things – to the extent that pollution in location A can be made 'the same as' pollution in location B.

Similar problems arise with the privatisation of land, privatisation of health care and the privatisation of biodiversity. As the great economic historian Karl Polanyi pointed out more than 60 years ago, certain vital things such as land, labour, water and medicine are only 'pseudo-commodities'.[209] They can never become fully tradable without society as a whole ceasing to exist.

I don't understand.

Take land. From a narrowly economic point of view, land is all the same, wherever it is, just as emissions reductions are said to be the same wherever they are made. Land creates economic value, wherever it is and whatever it is used for, just as, other things being equal, emissions reductions are good for the climate, no matter where or how they are made.

But suppose land became completely interchangeable with anything else, a completely fluid commodity, so that one piece of land could

be exchanged for another, or become the 'equivalent' of a certain amount of money, and thus easier to accumulate in large quantities in the hands of whoever had power, regardless of the land needs of others. Suppose *any* land could be bought and accumulated in *any* amount by *anybody* with the money to do so and then used for *any* purpose. Suppose it could be exchanged *for* anything *with* anybody *in* any amount.

In theory, it would then become possible for one person to own all land and everybody else to own none. It would be possible for any piece of land to be destroyed if whatever it was exchanged for were temporarily a source of greater profit. It would be possible for most land to be treated as a speculative instrument without even being used, while people went hungry. It would be possible, in short, for people who owned the land never to see it or know anything about it. It would be possible for them to do anything with their land regardless of the consequences to their neighbours. Framing land as a commodity in such a thoroughgoing way would require suppressing many of the things that makes a piece of land in location A different from a piece of land in location B. If carried too far, this would have fatal results.[210]

But no one would ever carry things that far.

Obviously not. 'To allow the market mechanism to be the sole director' of how land is used, Polanyi wrote, 'would result in the demolition of society.' That's why, in the real world, all communities and states possess rules or customs limiting how far land can be exchanged, commodified, or accumulated, what it can be used for, and who can acquire how much of it.[211]

Equally obviously, there are social limits to how far you can go with pollution trading. If there were no limits, 'averaging' pollution over a large geographical area through a market would mean you could pollute a few places severely while cleaning up everywhere else, and still say you were 'improving' society's well-being. In the words of National Resources Defence Council attorney David Doniger, 'If all you had was emissions trading, you could pile up all the pollution in one place.'[212]

This is one thing that critics of pollution trading schemes have always worried about: that if a market makes it easier for companies to put their pollution anywhere they want, it will wind up on the doorsteps of the poor and less powerful. In fact, in the US, as across the world, pollution is already concentrated disproportionately in poor communities or communities of colour. Many people fear that trading will

only make it worse. They fear that the scientific fact that air pollution dumps do not respect political borders is being recruited in the service of economic and physical exploitation. This is the problem of 'hot spots'.

Are you saying this actually happened with US sulphur dioxide trading?

That's a matter of some controversy. Many factors are involved. Some factors in some emissions markets may actually militate against hot spots. For example, it's often easier to generate cheap credits from the worst-polluting plants, meaning that those living around them may see more improvements than others.[213] Some researchers say that communities of colour have actually disproportionately benefited from sulphur dioxide trading – except in the US South – although the same researchers add that poor communities have lost out to a small degree.

In geographical terms, though, the effects have clearly been uneven. While sulphur dioxide levels fell in the aggregate during the 1990s, they barely changed in the swath from Columbus, Ohio, to northern West Virginia. Hot spots have persisted east of Erie, Pennsylvania and near Kingston and Oswego, New York and Oak Ridge, Tennessee, according to the National Atmospheric Deposition Program. Since 1995, according to a study by the United States Public Interest Research Group, 300 of the 500 dirtiest plants actually increased sulphur dioxide emissions.[214] The government's Environmental Protection Agency found that emissions increased in Texas and Alabama, with effects felt in Florida.[215] In the 1990s, some locations, a large majority of which were poor and predominantly communities of colour, reported increased emissions of sulphur dioxide and resultant toxic co-pollutants such as particulate matter and volatile organic compounds.[216] This prompted the National Environmental Justice Advisory Council, a government appointed body, to oppose any expansion of pollution trading schemes in the US and called on the US government to address the environmental justice impacts of emissions trading. Government officials point out that many other hot spots have been 'cooled' – as they probably would have been under any reduction scheme – but admit that there have been exceptions.

Proportionally, populated areas have benefited less, because buyers of credits are concentrated in more populated areas. New York state, which is downwind of many power producers, believes that it is disadvantaged by sulphur dioxide trading on a national scale, and has pushed for a regional plan to overcome the dangers of 'averaging' over a large geographical area. In 2000, New York attached a financial penalty to the sale of New York sulphur dioxide credits to 14

upwind states believed to contribute to the state's acid rain problem. This was ruled unconstitutional by a US district court in 2002, setting off a high-level legal battle.[217]

Many critics are concerned, similarly, that when fossil fuel users buy rights to continue polluting their local areas, they are buying the right to release toxic substances in addition to carbon dioxide.

All right. But the problem of 'hot spots' seems pretty minor if it saves big business money in making short-term pollution cuts.

You may think so – provided it isn't your health or environment at stake. But remember that even in the US, airborne particles of sulphur dioxide, together with particles of NO_x, cut short the lives of an estimated 30,000 US residents each year as well as causing acid rain.[218]

Maybe so, but the programme might still have been 'efficient.' You can't tell for sure until you assign an economic value to the lives lost or damaged and do the arithmetic.

The problem is that for such calculations to be possible, you couldn't assign human lives a value so high that it would automatically outweigh almost any economic gains made elsewhere.

Well, sure. Making a market is like making an omelette – you have to break a few eggs. You can't assign an infinite value to unbroken eggs, otherwise you won't get your omelette. The eggs have to have a specific numerical value, and not too high.

And suppose the eggs – er, people – disagree with the statistical value their lives have been assigned? Or suppose they refuse to have any such value attached to their lives at all?[219]

They're not necessarily qualified to discuss it, if they're not economists, are they?

Are you suggesting that they don't know how to value their own lives?

Oops, that doesn't sound very democratic, does it? Let me rephrase that to make it sound better.

I'm not sure that will do any good. The point is that the new market's need for these calculations to be made leads unavoidably to political arguments – like the one we're having now. There's nothing 'neutral' about the project of making emissions reductions 'efficient' through trading schemes.

And probably you won't be surprised to learn that there are still further political difficulties with that project.

Conflicts over ownership

A basic requirement of any trading system is that everybody has to agree who the owners are of the goods to be traded. For a car market to work, for example, everybody has to agree that it is the car company that owns the product to be sold – not auto workers, nor communities near sources of raw materials, nor anyone else. In emissions markets, however, not everyone agrees who owns what. Many people claim that countries or firms are using pollution dump space that belongs to others.

The problem was already evident in the US's sulphur dioxide trading system, which granted pollution allowances only to the biggest-polluting private firms. Some environmentalists argued that it was electricity customers, not power companies, who should get the allowances, and that companies should have to buy them. 'It's the public's air that's being used as a waste dump,' observed attorney David Doniger of Environmental Defence in 2002. 'There's a good argument that you ought to pay to use the dump.'[220]

Even deeper and more wide-ranging difficulties about ownership afflict the Kyoto Protocol and the EU Emissions Trading Scheme. As economist Simone Bastianoni and colleagues observe, such programmes require an 'accounting method to create a greenhouse gas inventory which also assigns responsibility for emissions'.[221] To put it more briefly: emissions markets need to know who it is exactly that's warming the globe.

Sounds like an easy question.

It's not. It's a little like trying to work out in the courts who is responsible for an industrial accident that takes off a worker's finger. Is it the co-worker who wasn't watching? The manufacturer of the machinery? The contractor who operates it? The person who invented it 50 years ago? The owner of the company hiring the contractor? The owner of the factory site? The government safety board? The worker herself?

Similarly, who's responsible for the burning of fossil fuels in the petrol tank of a particular car? The car owner who drives it? Exxon, who drilled the oil? General Motors, who built the car? The politician who defeated the mass transportation system that would have made the car's purchase unnecessary? The government of the country within whose borders the car is driven? Should countries be held responsible for their

current emissions or for their historical emissions as well?[222] Climatology and economics have no answers to such questions. Different agents will be held responsible in different accounting systems.[223]

Look at what's happened to the EU ETS. The EU decided that private companies burning fossil fuels would be considered, for the purposes of the scheme, the only emitters. These are companies like RWE, Cementa, Scottish Power, Vattenfall, Ineos Fluor and so forth.

That sounds reasonable enough. What was the alternative?

In choosing to give rights to the world carbon dump away to corporations, European governments decided *not* to give rights to others, including ordinary citizens. In choosing to give rights to corporate 'downstream' energy users, it chose *not* to give them to 'upstream' producers of oil, gas and coal.

Was that a problem?

It created a whole nest of them – economic, political and technical. First, the question arose, as in the US, of why assets in what should be a public good are being channelled into private hands. Then there was the expense involved in distributing rights to thousands or hundreds of thousands of 'downstream' energy users rather than a manageable handful of 'upstream' suppliers of fossil fuels. Added to this was the question of arbitrariness.

How so?

For the sake of convenience, only big energy users could be included.[224] The domestic, transport and small-business sectors had to be left out.

Even so, there are so many industrial users that the costs of attempting to monitor and administer the scheme are huge. That does create a lot of lucrative work for financial centres like London and Frankfurt – which may have been one of the attractions of the arrangement. But the public has to foot the bill.[225]

Moreover, if the government finds itself too weak to take away the emissions rights it has temporarily granted the big industrial participants in the market, other sectors – transport, individual homeowners, government institutions – will have to bear more of the burden of meeting emissions targets.

In addition to being inefficient and expensive, the decision to make energy users the owners of emissions allowances failed to address the global warming problem closer to its root. As emphasised earlier in this special report, the main current threat to climatic stability is the

flow of fossil carbon out of the ground. It's both more economical and more logical to curb this flow at the relatively few points it occurs than to attempt to impose centralised control over millions of separate users of coal, oil and gas.

Maybe so, but by the same token, isn't it true that putting the point of responsibility closer to where fossil fuel flows out of the ground would run against the immediate interests of influential oil and coal companies?

For sure – unless they were handed a large number of free rights to the world's carbon dump.

But presumably in that case, they would find themselves under fire for capturing unacceptably large rents from the customers to whom they would pass on their costs.[226]

I think you're beginning to see why it's not a simple question of expert technique to decide who the owners of emissions rights are going to be. It needs public discussion.

It seems like everybody's going to be in conflict with everybody else.

Conflict has already broken out over rights given out by the EU ETS. In a rerun of some of the squabbles that plagued the US sulphur dioxide trading scheme, for instance, the award of carbon credits to various EU energy and chemical corporations merely for having obeyed

Whose Carbon Dump Is It?

Industrial manufacturers aren't the only people caught up in the new conflicts over ownership of carbon dumping space.

In New Zealand, plantation owners joined battle with the government in 2003 over who owns the carbon in 200,000 hectares of trees planted after 1989, which are eligible under the Kyoto Protocol to count as 'carbon sinks' that soak up the country's industrial emissions. The owners claimed the government was trying to steal NZD 2.6 billion from them with a stroke of the pen, 'possibly the largest private property theft in New Zealand's history.'[233] They vowed to 'take whatever action is necessary' to ensure just compensation for their purloined property.[234]

In the UK, meanwhile, trouble is brewing between firms that sell rights over the carbon-absorbing capacity of trees to the public and some of the local or state organisations that raise the trees. The marketing firms, it's alleged, are manoeuvring the forest-planting organisations into signing contracts relinquishing these rights for a period of 99 years for a pittance. The marketing firms then sell these rights on to the public for a huge mark-up, claiming falsely that they can make consumers' jet flights or home heating 'carbon-neutral'.

government regulations or having received government subsidies prompted protests and even legal action.[227] As metals manufacturers threatened to stomp out of Germany over having to pay for the EU pollution allowances German utilities got from their government for free,[228] the tiny Saxon village of Heuersdorf challenged the award of free rights to the energy and coal-mining firm Vattenfall, whose operations have troubled local residents. The only reason Vattenfall has been able to gain access to this largesse, Heuersdorf claims, is that it was also the beneficiary of government subsidies for brown coal mining in the 1990s that later made it possible for it to take 'early action' on carbon emissions.[229]

Then the European Commission started making plans to bring aviation into the EU ETS, arguing that state-owned airlines ought to be 'responsible for emissions…rather than alternatives such as airports and fuel suppliers'.[230] Yet the Commission was uncomfortably aware that giving out emissions rights to state-owned airlines 'could fall foul of state aid rules'.[231] One banker fretted that the continuing debate over the ownership of emissions was becoming 'increasingly sterile'.[232]

With the Kyoto Protocol, the problems are even more intractable.

How so?

Early on, parties to the UNFCCC and their technical advisers singled out national territories (what University of Wisconsin historian Thongchai Winichakul calls 'geo-bodies')[235] as the relevant emitters, global warming agents and owners of pollution permits. Anything emitted on Mexico's territory, say, would be considered to be emitted 'by Mexico'. But this seemingly 'neutral' unit of analysis was immediately entangled in disputes over responsibility, history, politics and exploitation. People pointed out that some of the dump space earmarked for emissions originating on one country's territory would in effect be used by other nations. One country would wind up using dump space that should belong to another.

What do you mean?

Southern negotiators and others argued that 'inventories should focus on the location of economic demand' for carbon-intensive practices 'rather than on the site of production'.[236] Why, for example, should Mexico be held solely responsible for emissions involved in producing goods for the US?

Economists asked why a country should be held responsible for the emissions of (for example) trucks crossing its territory, if it neither produces nor uses the goods that they carry. In extreme cases a country

could even end up being held responsible for high emissions used to produce and transport goods none of which its citizens enjoyed. Yet singling out final consumers as the real emitters might not provide direct incentives for cleaner production.[237]

At the same time, environmentalists questioned whether entities called 'Russia', 'Ukraine' and 'the UK' should be credited with post-1990 emissions reductions that are in fact due to post-Soviet economic collapse or the aggressive anti-unionism of Margaret Thatcher, the resulting collapse of the coal industry and the rise of less-polluting natural gas as a fuel.

Indigenous movements, meanwhile, argued that it is they, not national governments, that have reduced emissions by opposing oil drilling on their territories.[238]

Other activists insisted that colonial history and patterns of imposed development were also relevant to negotiating who the agents were to be in the new carbon emissions market. For example, oil imperialism shaped Saudi Arabia and other Middle Eastern nations as oil-dependent societies, while colonialism shaped Uruguay as a beef producer. Should today's Saudis or Uruguayans be held responsible for carbon dioxide emissions from gas flares or methane emissions from cattle?

I see. But in the end didn't everyone sweep aside all these arguments and agree that nation-states were responsible for emissions within their borders and would be the designated owners of emissions permits?

The Kyoto Protocol did try to sweep these arguments under the rug, yes. But they've never gone away. In fact, controversies over who the owners of rights to the earth's carbon dump should be – and how many rights they should have – have only increased.

How's that?

Well, take, for example, the UK component of the EU ETS. As shown in Table 2 (on page 89), UK industry, mainly heavy industry, is being granted monetisable access to between approximately two and a half to five per cent of what might be called the 'available' world carbon dump (the figure for the EU corporate sector as a whole comes to between 23–45 per cent). UK population, by contrast, comes to only one per cent of the world total.

The dump space granted to the UK, moreover, does not fall, geographically or otherwise, under UK legal jurisdiction as conventionally understood, but is used by all of the earth's inhabitants. The UK

government has given away to its private corporations something that is not its to give.

The injustice involved is not abstract. It's bound to have concrete political results. Southern countries are just as unlikely to sit still while the new 'resource' of carbon-cycling capacity is given away to Northern industry as Northern countries are unlikely to sit still for proposals for a fairer system.

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But wait a minute. Is it really all that unfair to award the lion's share of emissions rights to big business in the North? After all, Northern countries and big business didn't know any better when they got into the habit of using so much of the world's carbon dump following the first decades of the industrial revolution. Sure, they know now that their actions are causing global warming. But they didn't know then. You can't hold them responsible.

Maybe not. But they have benefited from using this capacity, and they continue to benefit today, while everyone is going to pay the price.[239]

But aren't these big fossil users performing a valuable public service? It's a common belief among US citizens, for instance, that their country's disproportionate use of world resources is justified because the country's economy and foreign assistance programmes benefit the whole world. If that's the case, then perhaps it's a good thing that the US and other industrialised countries be given the lion's share of emissions rights.

This argument echoes the one usually made for making corporations the beneficiaries of handouts of property rights: that the public gets something in return. For example, when railroads were given land grants by the US government to use or sell in the 19th century, it was expected that they would provide transportation in the public interest. And when mining companies are given free or low-cost concessions, it is expected that society will benefit from the metals made available.

But how much has the South benefited from the North's overuse of the global carbon dump? Most people would argue the benefits have been relatively small and uneven, compared to the harm the South has absorbed in the past and is likely to suffer in the future. As Peter Singer puts it, 'many of the world's poorest people, whose shares of the atmosphere have been appropriated by the industrialised nations, are not able to partake in the benefits of [the resulting] increased productivity in the industrialised nations – they cannot afford to buy its products – and if rising sea levels inundate their farmlands, or cyclones destroy their homes, they will be much worse off than they would otherwise have been'.[240]

Fixing the market?

But maybe the market can be made fairer. The government could allocate emissions rights to itself and then auction them off to the highest bidders.

They would still end up in the hands of big polluters.

Or fees or profits from the sale or lease of emissions rights could be distributed through a trust to ordinary citizens, or communities, or producers of renewable energy.[241] *Or, better, they could be distributed directly to individuals or nations, eventually on a basis of per capita equality.*[242] *Each Southerner would ultimately get the same assets as everybody else, solving the justice problem at a stroke.*

This is the popular 'Contraction and Convergence' proposal put forward by the Global Commons Institute. Property rights in global carbon-cycling capacity would be distributed to nation-states and their distribution gradually equalised so that, by a certain date, every country would hold an amount corresponding to its population, or, alternatively, every individual would hold an equal amount.

These rights would be traded either by individuals themselves or by the state apparatuses of the countries in which the individuals lived. At the same time, the global 'cap' on emissions would shrink drastically to a level deemed sustainable by the international community. Today's large-emitting countries, after being granted the lion's share of newly-created assets, would thus find their property holdings dwindling over time, as they were redistributed to the world's poor and the total amount of rights was reduced.

Various versions of Contraction and Convergence already have the backing of most governments in the South and many non-government organisations, prominent public figures and political parties in the North.[243]

Sounds great!

It does, doesn't it? But the assumption that equity will be furthered in the current economic and political environment by commodification and systems of private property – and that states will be conscientious guardians of the public welfare – looks risky to many observers with experience of similar schemes. (See box: 'Little' People and 'Big' Resources.)

To what extent would Southern governments come under pressure to use their surplus citizens' allowances to attract dirty industries?[244] Would an equal per capita carbon allowance economy be any more successful in fostering equity than Nigeria's oil economy, Mali's cotton economy or the uranium economy of northern Canada or Australia? What scale of reform of local power structures would be necessary to prevent abuses in a system that granted lucrative assets to every local villager? Whose hands would the pollution rights eventually wind up in? A nominally equal-per-capita scheme that encouraged a state to subsidise the development of a high-carbon industrial structure would also pose new problems for citizens fighting fossil-fuel developments in their local areas. Contraction and Convergence's initial grant of a disproportionate chunk of lucrative assets to the rich, in addition, runs into the same difficulties as the Kyoto Protocol and the EU ETS. Under a Contraction and Convergence trading scheme, too, as under every other carbon trading programme, rules aimed at improving integrity and preventing fraud would continuously be threatened by the emergence of new and more ambitious liberalisation initiatives.[245]

Maybe we just have to abandon the idea that greenhouse gas emissions trading can be made fair.

Emissions trading's most powerful proponents probably never had that idea in the first place. Equality is not what emissions markets are about. Even the 'total product rule' that Ronald Coase relied on in his justification of pollution markets 'serves primarily as a mechanism for redistributing wealth' from poor to rich,[247] and from future generations to the present.[248]

You can go further and say that one of emissions trading schemes' political selling points is that they preserve *in*equality. And many mainstream environmentalist backers of trading schemes are perfectly willing to sacrifice some 'efficiency' to make them even more unequal.

How can that be? Isn't the main raison d'etre *of trading to cut the costs of environmental action?*

'Little' People and 'Big' Resources

Would giving everyone in the world equal rights on paper to the use of the earth's carbon dump make an egalitarian market possible? Would everyone have the power, the resources and the information to benefit? The question is similar to that of whether giving forest peoples paper rights to the biodiversity in their territories will ensure that they benefit from a biodiversity market. Yale University anthropologist and forester Michael Dove offers the following words of caution.

'[W]henever a resource at the periphery acquires value to the centre, the centre assumes control of it (e.g., by restricting local exploitation, granting exclusive licenses to corporate concessionaires, and establishing restrictive trade associations). The pattern is aptly expressed by a peasant homily from Kalimantan, which states that whenever a 'little' man chances upon a 'big' fortune, he finds only trouble. He is in trouble because his political resources are not commensurate with his new-found economic resources. He does not have the power to protect and exploit great wealth and so, inevitably, it is taken from him…the implication [of the proposal to extend a global system of rights to a new commodity] is that the global system that proposes to extend these rights, and the indigenous communities that are the intended beneficiaries, are structurally similar members of the same, integrated system. I suggest, rather, that the global system and these indigenous communities are structurally dissimilar members of a more loosely articulated system… inattention to this distinction is a function of a paradoxical tendency among scholars and planners to insist that systems are either all-embracing…or unconnected (e.g., indigenous communities). The concept of a differentiated system, with relations obtaining among dissimilar members, is relatively undeveloped in the international science and development community.'[246]

The trade in human organs also suggests difficulties with the idea that any equal distribution of tradeable property rights will automatically have egalitarian consequences. No one in the global organ market has ever been allocated any property rights over anyone else's organs. Everyone has an equal right to sell their own organs. Yet it is the poor who wind up selling their kidneys in today's organ-trading schemes, not the rich. 'Free choice' on paper is not the same as 'free choice' in the actually-existing market.

That's what we often hear from government officials and their economic advisers, and we'll continue to evaluate that claim as we go along. But in the meantime, it's important to note that most real-world trading advocates are willing to forget about 'maximising efficiency' if they think that'll help get big business's acquiescence in climate action.

How so?

Many economists who have looked into the matter agree that a pollution trading system will be more efficient – and less regressive – if the rights it creates are auctioned, not given away, and the revenue used to make necessary adjustments in the society.[249]

This is not what real-world trading schemes do. As noted above, US pollution trading programmes, the Kyoto Protocol and the EU Emissions Trading Scheme all give away pollution rights – and give them away to the worst polluters. So does the Regional Greenhouse Gas Initiative now emerging in the US,[250] which, like Kyoto, operates on the 'polluter earns' rather than the 'polluter pays' principle. This arrangement – known in technical jargon as 'grandfathering' – is welcomed by many of the same trading advocates who proclaim themselves to be primarily concerned with 'efficiency'.

Such trading advocates go along with grandfathered trading schemes less because they are 'efficient' than because they imagine that buying off the rich with formal rights to the open-access good that they have been using is necessary to get them to agree to reductions.[251]

This, many trading advocates believe, will obviate the need to undertake the difficult job of supporting and building effective popular movements, public leadership and public education around climate change that business and government will then have to follow. Hence the often-heard slogan that emissions trading is more politically 'realistic' than other options: by appealing to the powerful, it will supposedly achieve the same goal as mobilising ordinary people, and more quickly and with a lot less effort.

Let us listen, for example, to economists Robert Hahn and Robert Stavins:

> [C]ountries and special interest groups will not accept an agreement that substantially shifts the distribution of wealth or political power. This resistance means that market-based approaches… can facilitate the formation of coalitions of support through the grandfathering of rights.

'Any market-based approach that is implemented to control greenhouse gases', Hahn and Stavins go on,

> will vary dramatically from the textbook applications of these concepts. There are many reasons why market-based approaches will deviate from their ideal; an important one is politics. However, departure of actual instruments from a theoretical ideal is not enough, on its own, for rejection of the approach.[252]

Or the World Resources Institute:

> Politically, the issue is not necessarily economic efficiency but how any allocation mechanism will affect the specific interests of a particular participant or stakeholder. Auctions that make regulated sources pay for all allowances are presumably more difficult to implement, due to political resistance. Furthermore, potential new sources that would prefer an auction may not be sufficiently organised (or even exist) to lobby for it. Free historical allocations, or grandfathering, became the norm for the [US] Ozone Transport Commission NO_x Budget presumably because of political resistance to auctioning.[253]

Social regressiveness and a form of bribery are commonly built into trading schemes, both within and across nations.

A quick fix?

But maybe regressiveness, inequality and bribery are necessary evils. After all, surely fighting global warming requires working with the economic system that we have, not solving all the world's problems. Our children can't afford for us to wait for a regime of global equality, the overthrow of global capitalism or even just a more cooperative economic system before we move to rein in greenhouse gas emissions. And if that means we have to accept both unfairness and relative inefficiency, then so be it. Surely to deny this is to play into the hands of US President George W. Bush and others who are trying to obstruct genuine climate action.

There are several *non sequiturs* here that need a quick reply.

First, pointing out the obstacles to the economic novelty called emissions trading is not the same as calling for a global revolution against capitalism. Up to now, global capitalism – whatever is meant by the term – has got along quite well without emissions trading.

The fact that emissions trading is about 'creating a new market', while (say) commons, conventional regulation, and removal of subsidies are conventionally classified as 'outside the market' doesn't necessarily make emissions trading any more 'capitalism-friendly' than, say, conventional regulation or the redirection of subsidies. Most observers would argue that the type of enterprise associated with 'global capitalism' since the 19th century has actually been dependent for its survival on such types of state action.[254] Some would go even further, urging that no firm boundaries can be drawn between 'market' and 'non-market', 'inside the economy' and 'outside the economy', and 'capitalism' and a whole raft of supposedly 'noncapitalistic' types of

social and environmental control with pedigrees far older than that of emissions trading.[255]

In short, tackling global warming 'from within our current economic system' – whatever meaning is attached to that phrase – does not entail emissions trading. Business itself often points out that climate change can't be addressed without the sort of long-term targets and direction that can only be provided by forces commonly seen as 'outside the market'. No self-respecting big capitalists are likely to imagine that their survival depends on emissions trading.

Second, emissions trading, as what Ruth Greenspan Bell calls the 'most difficult of the economic instruments', is hardly going to be a good choice for anyone who wants speedy and effective action across the globe. In the classroom, where all the stage-setting and messy political and technical work it requires can be sidelined or ignored, it appeared a neat theory.[256] But in the real world, it cannot eliminate the need for hard decisions and hard political organising. Indeed, it makes the decisions and the organising even harder. As trading expert David Driesen writes, 'Emissions trading, rather than providing an antidote to the problems of complex decision-making that plague traditional regulation, provides a layer of additional complications and occasions for dispute.'[257] It is emissions trading itself that is turning out to require the impossible task of 'solving the world's problems.'

The evidence suggests, then, that it's carbon trading advocates, not trading critics, who are allowing the tail of their political wishes to wag the dog of what is practically possible.

The special problems of carbon projects

So far this chapter has explained why current large-scale attempts at setting up a market in allowances to emit greenhouse gases don't constitute an effective approach to climate change.

But – as explained in the last chapter – trading in allowances to emit isn't the only kind of carbon trading. Commerce in credits generated by special pollution-saving projects is also growing fast.

Remind me. What are these projects? How do they work?

From the beginning, private firms, Northern governments and the United Nations have been fretting that big fossil fuel users in rich countries won't be able to afford even the small cuts in fossil fuel use required by emissions trading programmes such as that of the Kyoto Protocol. As a result, they've hunted around for ways of allowing industry to continue to burn fossil fuels while still keeping their emissions under mandated 'caps'.

The main solution private industry and governments have turned to consists of special carbon-saving or carbon-sequestering projects – schemes that capture greenhouse gases, put them out of harm's way, use fossil fuels more efficiently, and so on. Instead of cutting off flows of waste into the overflowing world carbon dump, they've proposed building 'extensions' of the dump to handle the overflow. Acquiring certificates of 'ownership' of such 'dump extensions' entitles big polluters to emit more greenhouse gases than they have emissions allowances for.

It's a classic 'end of pipe' solution to pollution. Instead of cutting flows of a raw material into an industrial process, you fix the problem after the resulting waste is already coming out of the pipe.

How do these new projects fit into the world of trade?

The allowances and the special credits created by carbon-saving projects are all thrown into a big pot and traded one for the other. Everybody is supposed to benefit. Polluters save money by not having to stop polluting, and builders of new carbon dump make money by selling the new dump space they create.

What kind of carbon dump extensions are we talking about?

Two types can be distinguished. The first kind is built on using land, forests, soils, water, even parts of the oceans.

Some of these new dumps are literally holes in the ground. Oil companies are eagerly championing schemes that would allow fossil fuel users to capture their carbon dioxide, liquefy it, and park it in leaky geological formations such as old oil wells (Figure 5).[258] Other, even leakier new carbon dumps have been proposed for ocean bottoms (Figure 6).[259]

Figure 5. Storing carbon dioxide in geological formations. *(Source:* IPCC)

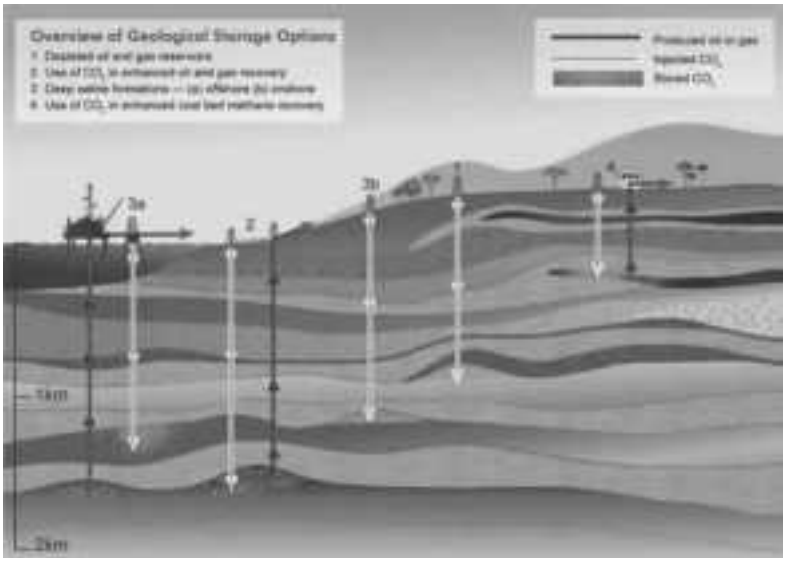
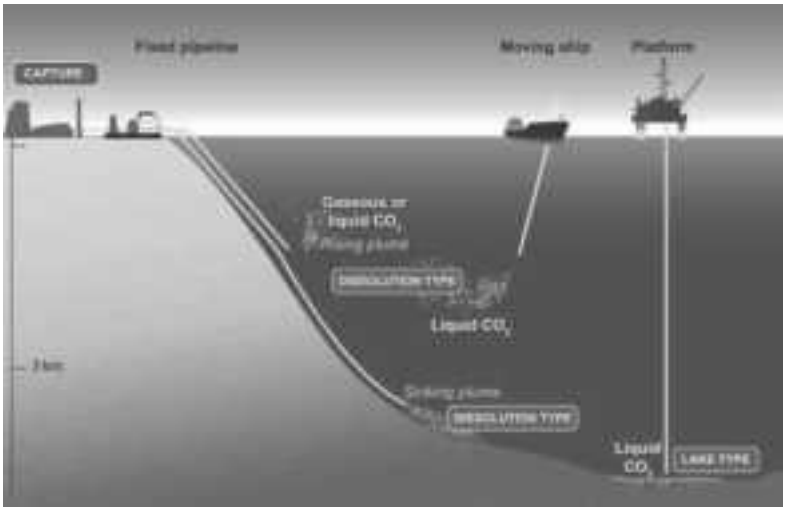


Figure 6. Storing carbon dioxide on ocean bottoms. *(Source:* IPCC)



Still other dump extensions consist of new trees planted to absorb carbon dioxide[260] or soils where tilling has been halted to allow carbon buildup, or stretches of ocean salted with iron to stimulate plant growth.

And the second type of dump extension?

Gas flaring. Companies may soon be able to get carbon credits for using the gas to generate electricity instead.

A second type involves various emissions-saving technologies. For example, companies wanting carbon credits can help refit factories in Korea or India to capture or destroy hydroflourocarbons such as HFC-23 or other powerful greenhouse gases such as nitrous oxide. Or they can invest in hydroelectric dams in Guatemala or Brazil that 'replace' electricity generated by fossil fuels. Or they can set up wind farms to generate green electricity, or institute efficiency projects that distribute energy-frugal light bulbs or rearrange traffic signals. Or they can grow biofuel plantations, which are claimed to provide 'substitutes' for fossil fuels. Or they can start up a project to feed supplements to Ugandan cows to reduce their methane flatulence.[261] They might even try getting credits for cleaning up debris left by the Indian Ocean tsunami.[262]

Another target for carbon finance is projects that take methane from, say, waste dumps in South Africa, coal seams in China, pig farms in Chile,[263] or flaring towers in Nigerian oil fields, and use it as a fuel for generating electricity. Many such projects release carbon dioxide, but are said to be relatively 'good' for the climate, since releases of unburned methane are even worse for the climate than carbon dioxide.

But wait a minute. Shouldn't it just be things like energy efficiency measures or solar power – or not building a plant at all – that get carbon money? Aren't those things all less carbon-intensive than methane combustion?

It doesn't matter. As long as a project emits less greenhouse gas than 'business as usual', it's in the money.

But who figures out what 'business as usual' is?

The project proponent's private consultants.

Who gives them the power to decide what is business as usual?

The UN does. Private businesses do. Government officials do. Individuals who buy carbon 'offset' credits do.

Some of these private consultants have also served on intergovernmental panels providing technical advice to the UN on what can be done about climate change and the carbon accounting methods that should be used for carbon projects.[264] That further increases their influence with governments, industry and the UN.

Isn't that a conflict of interest?

Yes. But no one's making a fuss. When challenged, UN officials say that the expert qualifications of these consultants, together with the process of peer review, exempt them from charges of conflict of interest.

But what about the public? Why can't the public have a say over what business as usual should be considered to be?

The public doesn't play much of a part in these discussions – if they are informed what's going on at all.

How do these consultants go about their business?

They identify the 'baseline', or business-as-usual scenario. Then they verify that the existence of the carbon projects is due to the finance generated by the carbon credits they sell. Then they subtract the greenhouse gas emitted under the project scenario from greenhouse gas emitted under the baseline scenario to come up with the emissions 'saved' by the project (see box, p. 61). In claiming that various non-carbon or low-carbon futures are not possible, they are, in a sense, appropriating these futures for their own use.

Let me get this straight. Under this kind of trading, the carbon accounts of, say, Nigeria, show a debit for carbon dioxide released by the gas flaring that the Western oil industry conducts within its borders. At the same time, that same industry (or an industrialised country sponsoring the technology that captures the gas and puts it to good use), can get carbon credits for whatever the 'climatic' difference is between using that technology and releasing unburned methane.

That's correct. Nigeria gets stuck with the responsibility for the emissions of a foreign oil company. Foreigners get the credits for some marginal, and probably profitable, efforts to clean up around the margins – efforts that are mandated by Nigerian law anyway.[265] It's a neat way for polluters to earn, while making poorer countries pay. It does no verifiable good for the climate, as we'll see in a moment. And it's all concealed under beautifully complicated accounting mathematics.

Today, dam companies, forestry firms, oil companies and the like are all seeking licenses to sell carbon dumping rights on the ground that their projects result in the emission of less carbon than business-as-usual 'alternatives' identified by experts.

So in theory, these carbon-'saving' projects could license the removal and burning of all the remaining fossil fuel still underground.

Yes.

But doesn't that reduce the whole idea of trading in carbon credits to an absurdity? Because isn't it true that if all the world's remaining fossil fuels are exhumed and burned, the human race is probably finished?

Yes. Carried to its logical extreme, trading in credits from 'offset' projects would result in a world in which all the coal, oil and gas had been burned up.

That calls up the image of a landscape full of wind farms, solar stations, and the carcasses of biofuel plantations and hydroelectric dams, all baking in an atmosphere hot enough to boil water.

Not a very nice picture. But presumably trading in carbon credits would never be carried that far.

No. But no one has ever suggested any ways of stopping it from doing so, either. Or any arguments why credit trading is not incoherent in just the way you've suggested.

So why are the world's governments still pursuing this idea?

No one is organised enough politically yet to call a halt to it. Meanwhile, the idea has great short-term appeal for business and governments.

Like 'pure' emissions trading (or cap and trade), trading that includes credits is supposed to save money by finding 'environmentally equivalent' actions that are in the short run cheaper to undertake. In fact, building or buying new carbon dump extensions is supposed to be even cheaper than buying some of other countries' share of the existing dump (assuming any is available).[266]

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In 1999, the World Bank was promising investors in its Prototype Carbon Fund credits at less than USD 5 a tonne – a bargain price that influenced all succeeding price-setting. In 2005, CDM carbon credits were trading at an average of around €6.7 per tonne of carbon dioxide, JI credits at around €5.1,[267] two to four times less than EU ETS allowances. Some planners had originally hoped that absorbing carbon dioxide by planting trees in poorer countries could be 'between 50 and 200 times cheaper' than reducing it at source.[268] As IPA Energy consultants have recently noted, permitting Northern installations to use Certified Emissions Reductions or CERs (as CDM credits are called) 'effectively constitutes a *second allocation*, at the CER price rather than zero cost'.[269]

But still, offsets encourage creativity in finding different ways to deal with climate change, don't they? For example, suppose you try to reduce emissions from jet aircraft by taxing short-haul air tickets so that they're USD 25 more expensive.

That might have some impact, but it's unlikely to deter most well-off people from flying. But if you encourage the same airline passengers to 'offset' their flights using that same USD 25, they can invest in all sorts of different climate actions on the ground. For example, a British Airways scheme offers schemes to plant trees or subsidise an energy-efficiency programme in rural India.

The problem is that for such offsets to work, carbon credits have to be climatically equivalent to carbon allowances. In other words, a carbon market that includes credits, like a market that includes only allowances, needs to ensure that the apples and oranges it is trading are climatically equivalent to each other.

Apples and oranges

Except that in the case of offsets, the apples and oranges are even more different from each other than they were with emissions trading.

Exactly. With emissions trading proper, the apples and oranges are, crudely speaking, emissions that come out of pipes in different locations through different processes and contexts. With a market that also involves project credits, the apples and oranges are far more diverse. The credits derived from various 'baseline-and-credit' schemes are different both from each other and from the emissions allowances associated with 'cap and trade' schemes. Destroying the industrial greenhouse gas HFC-23 is not the same as investing in windmills. Making your chemical plant more efficient is not the same as supplying efficient light bulbs to Jamaica. Planting trees is not the same as refraining from flying to the Maldives for a holiday. Yet all of these things need to be verified to be 'climatically equivalent' for credit trading to work.

In fact, the United Nations and other carbon trading advocates go so far as to claim that the carbon projects they are promoting are not only 'equivalent to', or 'compensate for', emissions reductions, but actually *are* emissions reductions. They assert that planting eucalyptus trees, building hydroelectric dams, burning methane or instituting efficiency programmes are 'reducing emissions' just as much as halting the flow of coal into a boiler, even if no emissions are being reduced.

So is there a problem? All these things are in fact climatically equivalent, aren't they?

No. That can't be verified.

So CDM schemes and other carbon projects don't, in fact, 'offset' or 'neutralise' industrial emissions?

No.

So they're not emissions reductions after all?

No. The putative commodity produced by CDM and similar 'carbon-saving' programmes can't be correctly referred to as 'emission reductions', 'carbon' or 'carbon dioxide equivalent', or any similar term. Unlike conventional dumps receiving industrial waste, mine tailings, or nuclear materials, the purported new carbon dumps carved out of the biosphere or the future can't even be verified to be dumps at all.

So in fact no one should be allowed to trade CDM or JI credits for allowances. And British Airways should not be claiming that its passengers can 'neutralise' their flights by giving money to tree-planters or efficiency programmes in India or South Africa.

That's right.

Well, I'm looking forward to hearing how you justify that claim. Because the UN and the IPCC, together with thousands of experts, claim that there are no scientific obstacles to trading credits for allowances.

The claim, unfortunately, is based more on free-market ideology and wishful thinking than scientific reflection. Just as in emissions trading, the 'baseline and credit' market's requirement that so many diverse things be made numerically equivalent has turned out to be its undoing. The difference is that the problems of trading systems that include project-based credits are even more intractable even than the problems of allowance trading alone.

OK, give me the bad news.

Accountants as storytellers

Let's begin with an insoluble quantification problem that's common to all carbon-'saving' projects.

As noted above, all such projects calculate carbon 'saved' by relying on experts' assessments of 'what would have been the case without the project'. The difficulty is that no expert has either the ability or the right to determine a single scenario describing 'what would have happened without the project'.

For instance, no expert can calculate what role CDM projects have in foreclosing or promoting structurally different long-term low-carbon futures. All they can do is calculate the role they might have in making certain more or less arbitrarily chosen 'business-as-usual' pathways marginally more carbon-efficient.

You'd better explain that in words of one syllable.

The credits that a carbon project generates are calculated by subtracting the emissions of the world that has the project in it from the emissions of an otherwise-identical possible world that doesn't. This last world is called the 'baseline'. Industrialised countries or corporations can then buy credits representing the emissions that are claimed to have been saved over the 'baseline' in lieu of reducing their own fossil fuel use.

Right…

To make this work, however, the market needs a single number. You can't very well say that your wind farm or HFC-23 project generates 'either 10 tonnes in carbon dioxide equivalent credit or 100,000 tonnes, depending on which baseline you choose.' That would mean chaos. Sellers wouldn't know how much of their commodity they were selling. Buyers wouldn't know how much they were buying. So you can choose only one baseline.

OK, I'm with you so far.

The problem is that it's impossible to isolate this single baseline and thus fulfil the requirement of a market for a single number. Even many trading proponents acknowledge the 'impossibility of measuring or even defining savings that are additional to those that would have occurred in the absence of emissions credits.'[270]

What's the difficulty?

Many without-project scenarios are always possible. The choice of which one is to be used in calculating carbon credits is a matter of political decision rather than economic or technical prediction.[271]

The evidence usually cited to support claims that various schemes would not have been undertaken without carbon investment, moreover, is riddled with irresolvable uncertainties. One study of six proposed carbon plantation projects in Brazil couldn't come to any more definite conclusions than that 'at least one and possibly five' of the six were 'non-additional.' The evidence was 'completely unreliable' about which project would be profitable or go forward without

'Free-rider credits from non-additional CDM projects threaten to undermine the environmental integrity of the Kyoto Protocol. Some CDM regimes could lead global emissions to increase by as much as 600 million tonnes of carbon relative to the Kyoto Protocol target, if credits awarded spuriously to projects that would have happened anyway are used in place of real carbon reductions … . These free riders would amount to a multi-billion dollar cross-subsidy to CDM project participants at the expense of the global environment.'[284]

Steve Bernow et al., 2000

carbon money. Depending on discount rates, baseline vegetation estimates, carbon accounting systems and expected price variations, calculations of the value of the carbon credits to be generated differed by as much as an order of magnitude.[272]

So measuring carbon credits is completely different from measuring emissions.

Yes. While scientists can usually agree about how to read dials, calibrate gas detectors, and perform the other tasks necessary for directly measuring real emissions (assuming the necessary instrumentation is present), no consensus is attainable anywhere about how to isolate one single hypothetical storyline from among many possible storylines and measure the hypothetical emissions associated with it.

So while some scientific basis exists for markets in emissions, none exists for markets in project-based 'offset' credits, or markets in which emissions allowances and project-based credits are interchangeable.

So there are likely to be differences of opinion about how many credits any particular project generates, or whether it generates any at all.

That's putting it mildly. Try to imagine, for example, what would have happened without a given tree plantation project in Brazil. Suppose you hire an expert to extrapolate what kind of vegetation would grow on the site without the project over the next 100 years. People are going to disagree with your findings. Suppose you hire someone to find out how the project will affect future investment at the company receiving the carbon credits. People are going to disagree with what you conclude. Suppose you hire someone to find out how the absence of the project would change local carbon use over the next century, looking into things like land speculation and land prices, land reform, road building, logging, soybean production, oil palm markets, changes in inflation rates, the profitability of beef production, alternative investments, prices and times for transport, and so on.[273] People are going to disagree with those findings, too.

Experts who back this market have themselves long admitted that estimates of hypothetical 'emissions reductions' for many projects can be expected to differ by hundreds of percent given only small changes in initial assumptions.[274] Michael Schlup of the Gold Standard, an organisation that hands out a special certificate to CDM projects it considers of high quality, has claimed that up to 50 per cent of projects are not really 'additional' but merely relabelled business as usual. CEE Bankwatch, in a study of a World Bank Prototype Carbon Fund's JI project supporting small hydropower plants in the Czech Republic, recently argued that only six of the 16 installations involved repre-

sented anything other than business as usual.[275] Strife has also broken out in the UN and in the corporate world. Most CDM carbon accounting methodologies proposed to date have been rejected by the CDM methodological panel for having implausible baselines.[276] DuPont has accused its rival Ineos Fluor of overstating emissions 'reductions' from abatement projects (using a methodology that was approved by the CDM Executive Board) by a factor of three due to inflation of baselines.[277] Germany's Steinbeis Foundation has started a public campaign protesting CDM Executive Board decisions on permissible baselines for municipal waste projects.[278] Project certifiers have expressed concern that UN rulebook's inability to screen out 'business as usual' CDM projects makes it hard to calculate carbon credits.

Speakers at an event arranged by the International Emissions Trading Association (IETA) during international climate negotiations. IETA is a coalition of private companies including AES, Barclays Capital, ChevronTexaco, ConocoPhillips, DuPont, Ecosecurities, Gaz de France, Goldman Sachs, Gujarat Fluorochemicals, J-Power, KPMG, Lafarge, Lahmayer, RWE, Shell, Total, Toyota, TransAlta and Vattenfall.

According to Mark Trexler, a carbon businessman with 15 years' experience, the resolution of the debate about how to decide whether a project would have happened anyway 'seems as elusive as ever'. 'There is no technically "correct" answer', Trexler concedes. 'Never has so much been said about a topic by so many, without ever agreeing on a common vocabulary, and the goals of the conversation.'[279]

This lack of verifiability would seem to open up a lot of possibilities for corporations or governments to employ creative accounting in order to claim the maximum number of carbon credits.

You can come up with almost any number you want. Both the incentives and the opportunities are huge.

As trading expert Michael Grubb and colleagues observed years ago, 'every government and every company'[280] wanting carbon credits has an incentive to try to get them for projects that it is already implementing or had planned even before carbon markets came along. All you have to do is hire an expert who is willing to make 'business as usual' appear as bad as possible. 'The more conventional the baseline, the more additional funds or credits… can be recovered' from your carbon project, note Hermann Ott and Wolfgang Sachs.[281]

The result, as one barrister and banker, James Cameron of Climate Change Capital, notes bluntly, is that many carbon project proponents 'tell their financial backers that the projects are going to make lots of money' at the same time they claim to CDM officials 'that they wouldn't be financially viable' without carbon funds.[282]

In 2003, for example, the Asian Development Bank funded the proposed Xiaogushan dam in China, portraying it as the cheapest and most economically robust alternative for expanding electricity generation in Gansu province. Construction went ahead without any

mention being made of the need to secure CDM funding beforehand, and was scheduled to be completed in 2006. Yet in a June 2005 application for Xiaogushan to be considered as a CDM project, the World Bank claims that without CDM support, the dam 'would not have been able to reach financial closure, mitigate the high project risk, and commence the project constructions'.[283]

Similarly, CDM credits are being sought for the Bumbuna hydroelectric project in Sierra Leone on the grounds that the project is unviable without them, although the project was approved for financing by the World Bank in 2005 as the least-cost project for the country's power sector.[285] In one Latin American country, consultants tippexed out the name of a hydroelectric dam from a copy of a national development plan in an attempt to show that the dam was not already planned or 'business as usual' and therefore was deserving of carbon finance.[286]

At an event arranged by the International Emissions Trading Association in Milan in 2003, a representative of the Asian Development Bank confided that his institution's first reaction to the CDM was to go through its existing portfolio to see which projects' funding might be topped up with carbon finance. No one was under any illusion that carbon money would be used for anything other than what the bank itself acknowledged to be business as usual. (For more examples, see Chapter 4.)

'The CDM will be prone to fraud and fluctuations beyond control of the developer or the CDM board.'[293]

O.P.R. Van Vliet et al., 2003

In announcing its withdrawal from CDM projects in 2004, Holcim Cement went as far as to warn that CDM carbon-accounting methodology 'will create other Enrons and Arthur Andersens,'[287] referring to recent accounting scandals at the two firms. A year and a half later, even Einar Telnes, a Det Norske Veritas executive representing the forum of private firms that profit from validating and verifying carbon projects, was publicly fretting that the big differences between how different carbon accountants tallied up credits 'could lead to a lack of confidence in the market as such... . We don't want an Enron scandal where excess CERs [CDM carbon credits] are issued without the actual reductions taking place... . It is crucial that those verifying have the necessary knowledge. Many of them don't.'[288]

A UK Parliamentary Committee was less guarded, lambasting the experimental UK Emissions Trading Scheme, which had paid more than GBP 100 million to four companies 'for keeping emissions down to levels they had already achieved', as 'bullshit', 'stupid', a 'mockery', and an 'outrageous waste of public money' that undermined government emissions reduction policies.[290]

Baseline accounting procedures also set up perverse incentives for carbon project proponents to emit as much greenhouse gas as possible today in order to make projects appear to be saving as much carbon as possible tomorrow. Why not step up pollution or degrade more forests today in order to make more carbon money later? Throughout the South, the CDM is creating incentives for emissions-related environmental laws not to be enforced, since the greater the 'baseline' emissions, the greater the payoffs that can be derived from CDM projects. Even sincere unfavourable predictions about 'what would happen' without a CDM project may function as self-fulfilling prophecies.[291] With a bit of judicious accounting, a company investing in foreign 'carbon-saving' projects can increase fossil emissions both at home and abroad while claiming to make reductions in both locations.[292] The calculational machinery that would be necessary for a market in CDM credits, in other words, is itself undermining predictability and the possibility of market calculation.

CDM carbon-credit accounting 'will create other ENRONs', according to one carbon-credit buyer, referring to the accounting fraud that devastated the energy-trading firm. Not surprisingly, perhaps, the disgraced firm was a staunch backer of the Kyoto Protocol's carbon trading systems.[289]

Perhaps understandably, a few years ago, developers, brokers, Northern government ministers, the World Bank and others frustrated by the sluggish pace of carbon project development tried to float the idea that CDM schemes should not even need to show that they would not have happened without carbon investment.[294] Other experts suggested that the question of 'what would have happened without a project' should simply be decided arbitrarily, to save trouble.[295] That was as much as to admit that the carbon credits your project is going to sell can't be proved to have anything to do with climate. You might as well call them 'schmarbon credits.'

Do carbon market advocates think that people are really going to pay money for these 'schmarbon credits' if they can't be verified not to be a sham?

You have to remember that in this market it's in the interests of both buyers and sellers to inflate the number of carbon credits a project generates. So there are a lot of incentives on all sides to keep quiet about what's going on.

As yet, Northern businesses and ministries don't need to worry whether the market has anything to do with climate or not. Their job is only to get hold of cheap credits. And many individual consumers buying 'offset' credits on the voluntary market tend to rely on carbon traders' glossy brochures, which are better at salving consciences than providing balanced analysis. There aren't many checks and balances built into the system.[296]

In a sense, today's carbon credit market is about appearances and public relations. At present, it doesn't matter whether what the project-

based credit market sells is 'carbon' or 'schmarbon.' Nor does it matter that no one knows what schmarbon is. In this market, image is as saleable as reality.

But if this 'schmarbon market' isn't about climate, then what is it about? Aren't people eventually going to want to know what is being bought and sold?

Very likely. To survive for very long, the market will ultimately have to deal in something more concrete whose quality can be verified. It won't be enough of a guarantee of product quality that buyers and sellers agree to label their commodity 'carbon' or 'emissions reductions', if in fact it's only schmarbon. To put it another way, sooner or later the quality of the image will have to be measured by the reality.

George Akerlof

At that point, the project-based credit market begins to run the risk of becoming what economist George Akerlof calls a self-destructing 'lemons market'.[298] In such a market, because the quality of goods can't be proved, buyers can neither locate, nor create demand for, quality products, if any exist at all. 'Lemons' are loaded onto the market, and buyers won't pay the prices demanded by any sellers of higher-quality products. Better projects are penalised and bad 'free-riders' subsidised. Transaction volume and quality both decline, further lowering prices and quality in a cumulative process which ultimately destroys the market.

Notes Francis Sullivan of HSBC, the Hong Kong and Shanghai Banking Corporation, 'there is little incentive for a small company, or even a big business' to spend a lot of time looking for high-quality carbon credits 'when there is a risk of losing credibility and wasting money' due to lack of a credible standard. Sullivan relates that when HSBC put out a tender for carbon credits in the voluntary market, suppliers came forward with credits with a huge price range between USD 3–25 per tonne. 'If there's an eight-fold difference in price, you can't be talking about the same product,' Sullivan points out.[299]

Of course, when sellers can't verify commodity quality any better than buyers, and know it, the situation is even worse. And it's worse still when not even buyers are concerned about verifiable quality, but only about fulfilling legal commitments at the cheapest possible price.

Yet such are the demands of the market – and the self-defeating determination to ignore logic in order to 'keep Kyoto going' – that consultancies, UN bodies and technocratic NGOs such as the World Resources Institute continue relentlessly to try to develop techniques for isolating unique, quantifiable counterfactual baselines.[301]

'Better than the Alternative'

Development professionals have often tried to justify failed projects and policies by claiming that at least they were better than 'what would have happened otherwise'.

World Bank officials consistently used this reasoning to justify their agency's decades-long political intervention in Zaire in support of the dictator Mobutu Sese Seko, who openly stole hundreds of millions of dollars from his country.[300]

Justifying climatically-damaging carbon 'offset' projects using the same reasoning is child's play by comparison.

Why didn't the marketeers see this coming? Were the signatories of the Kyoto Protocol asleep? And what's the excuse of the European governments who decided to accept project-based carbon credits in the EU ETS?

Those are all good questions. The impossibility of measuring pollution 'offset' credits was already plain to see in the US's earlier pollution trading programmes.

Oh, no. You mean this is another case of 'lessons unlearned'?

I'm afraid so. In the US, they even had a term for meaningless pollution credits handed out to industry for actions that would have happened anyway. They called them 'anyway tonnes'.

Could you give some examples?

One instance was the Los Angeles Regional Clean Air Incentives Market (RECLAIM) described above. The South Coast Air Quality Management District (SCAQMD) allowed factories and refineries to avoid installing pollution control equipment if they purchased credits generated by licensed car scrappers who destroyed old, high-polluting cars. The idea was that it would be cheaper to reduce overall pollution by buying up and destroying old cars than by forcing stationary sources to make technological changes in their plants. It was an early example of the 'offset' reasoning that's now so prominent in the Kyoto Protocol's carbon market.

'In all the excitement over the imminent arrival of a fully-fledged carbon market, we may be losing sight of one fundamental question – what, exactly, are we trading in?'[297]

Environmental Data Services Report

In other words, they were claiming that getting rid of cars was just as good for the air as making factories cut down their pollution?

Exactly – and that the two could be traded for each other. Unfortunately, car scrappers often generated fraudulent pollution credits by crushing car bodies without destroying the engines, which they then sold for re-use. More to the point, the pollution credits generated by scrapping cars were based on the assumption that if they were not

scrapped, the cars would be driven 4,000–5,000 miles annually for an additional three years and that their owners would then replace them with automobiles with 'average' emissions.

Yet a SCAQMD audit found that many of the cars were at the end of their useful lives, and would have been destroyed through natural attrition. Some 100,000–200,000 old vehicles are scrapped or abandoned in the Los Angeles area annually in this way without the intervention of pollution trading programmes. Most of the 23,000 cars that were destroyed under the pollution trading scheme during its first five years were arguably among those that would have been destroyed even without the programme. After all, why sell your old car for its USD 50 value as scrap metal when you can obtain USD 600 for it through a pollution trading scheme?[302]

Moreover, of the cars that were not at the end of their lives, in addition, many were not regularly driven and would not have been driven for another three years. Inoperable cars were often brought to car scrapping facilities and minor repairs made solely for the purpose of obtaining the USD 600 payment from the scrapping program. Such cars were not generating any pollution, but merely collecting dust. Non-existent automobile pollution was transformed, through the market, into real pollution released from oil tankers or other sources. The end result was to increase aggregate emissions across the region.[303]

In the 'bubble' trading system instituted by the US Environmental Protection Agency, similarly, polluters almost never undertook fresh pollution control projects to satisfy regulations. Instead, they claimed credits for reductions that presumably would have occurred without the regulation. For example, polluters often claimed credits for routine business decisions to slow down production or shut down facilities.[305]

In the 1970s, states lured new industry by providing firms with 'offsets' that the states themselves created – in one case credits for 'an asphalt substitution process that already was occurring for non-environmental reasons'.[306] In the 1980s, similarly, Ashland Oil didn't want to comply with a requirement that it lower emissions from certain storage tanks. Instead, it petitioned to be allowed to reduce the allowable emission rate from a gasoline truck loading facility from 50.7 to 19.0 tonnes per year – even though the facility was already emitting only 4.4 tonnes per year.[307] Not surprisingly, such gambits were heavily criticised by environmentalists.

Nor were such absurdities confined to the US. The Global Environmental Facility, which serves as a financial mechanism for both the UNFCCC and the 1992 UN Convention on Biological Diversity, early on ran into similar accounting problems. The GEF was supposed to fund only that element of a project that resulted directly in the reduction

Communities Fight Back in the Courts

In 2002, two environmental groups, Our Children's Earth and Communities for a Better Environment, sued nine Los Angeles organisations for purchasing pollution 'offset' credits, including the city of Burbank, Southern California Gas and United Airlines. The groups pointed out that the credits had not been approved by the Environmental Protection Agency.

The offset credits – awarded for activities such as replacing standard buses with vehicles fuelled by natural gas – had become particularly attractive when prices for credits from stationary sources climbed as high as USD 62 per pound during the California energy crisis of 2000–01. Prior to the crisis, stationary source credits had cost around USD 1 per pound.

The NGO plaintiffs argued that allowing such credits into the market defeats its fundamental purpose. 'Credits are supposed to become so expensive that it forces some companies to put on controls,' they said. 'We're just enforcing the programme.'[304]

of greenhouse gas emission and so would yield a 'global environmental benefit'. Under this methodology, a project proponent had to describe what would have happened in the Southern host country 'but for' the GEF investment. Only then could the GEF provide the funding that made the alternative or additional climate-friendly activity possible.

But this approach turned out to be 'fraught with political and methodological difficulties'. For one thing, it 'excluded the participation of recipient country officials in most cases, because of the lack of understanding of the concept and methodologies'.[308] For another, it 'tempted governments to lower a domestic environmental baseline to become eligible for a larger GEF grant'. The result was that Northern governments decided that no one could receive GEF funding just by claiming their project was better than 'what would have happened otherwise'. They had to try to show that it was better than what *should* have happened in the project's absence.[309]

But haven't there been any 'offset' success stories?

The one pollution trading scheme generally cited by carbon trading advocates as a success story – the US's sulphur dioxide trading programme – had the advantage that it *excluded* project-based 'offset' credits.[310] What were measured and traded were emissions, not purported 'emissions reductions' derived from projects claimed to be improvements on 'business as usual'.

This is in sharp contrast to the Kyoto Protocol (a programme that is supposed to have been inspired by the sulphur dioxide scheme), which has fully embraced 'offset' projects in its trading programme.

Sinks, biophysics and the unknown

Some of the worst trouble that carbon market planners have landed themselves in has come about as a result of credit-generating schemes that purportedly soak up carbon dioxide through tree-planting or other biotic means. There are even more verification problems with these 'carbon sink' projects than with other 'offsets.'

Don't tell me. How could things be any worse?

From the beginning, climate technocrats have been under heavy pressure to try to operate a 'system of credits and debits wherein emission or sequestration of carbon in the biosphere is equated with emission of carbon from fossil fuels'.[311] They've been pushed into trying to prove that a world which closes a certain number of coal mines or oil wells will be climatically equivalent to one which keeps them open but plants more trees, ploughs less soil, fertilises oceans with iron, and so forth.

So the idea is that if you plant enough trees, you can go on mining and burning fossil fuels forever.

Well, not exactly. Even the biggest fans of tree 'offset' projects admit that there's not actually much scope for using tree-planting to deal with the climate crisis.

As Chapter 1 noted, the pool of carbon stored in living biomass is dwarfed by the pool of remaining fossil carbon awaiting exploitation. Under the most favourable assumptions, using trees even to try to 'compensate' for current emissions would require protecting impossible continent-sized plantations rigorously for decades.[312] Trying to counteract a single year's emissions in the UK would necessitate covering Devon and Cornwall with trees.[313] Doing the same for a single year's global emissions would mean, at a minimum, setting up and protecting industrial plantations on all 'available' land in Brazil for the next 40 to 50 years.[314] Attempting to absorb the carbon dioxide released by the burning of the fossil fuels still in the ground would require additional planets full of trees. As a distinguished group of scientists writing in *Science* concluded:

> Prospects of retrieving anthropogenic CO_2 from the atmosphere by enhancing natural sinks are small… There is no natural 'saviour' waiting to assimilate all the anthropogenically-produced CO_2 in the coming century.[315]

A similar point applies to projects producing biofuels to replace petroleum. Gigantic plantations would be required just to replace a tiny

fraction of the fossil fuels used for transport. It is estimated, for instance, that even if the entire US maize crop were used for ethanol, it would replace only about 20 per cent of domestic petrol consumption.[316] To power 10 per cent of the US's cars with home-grown maize-based ethanol, according to the Organisation for Economic Co-operation and Development, would require almost one-third of US farmland.[317] A study sponsored by the European Environment Agency and the German Environment Ministry doesn't see it as desirable to plan for more than 10 per cent of the EU's transport fuel demand to be met by biofuels.[318] Biofuels can make up no more than 5 per cent of petrol or diesel consumption in the US and the European Union without causing environmental damage, according to a report from Bank Sarasin.[319]

What's more, there is no guarantee that the huge takeover of land would slow in any way the exploitation of the fossil fuels still remaining underground. Such so-called 'renewable' fuels are not, in fact, going to be renewable if today's industrial, transport and military structures remain locked in place. As columnist George Monbiot explains, 'every year we use four centuries' worth of plants and animals' in the form of coal, oil and gas. 'The idea that we can simply replace this fossil legacy – and the extraordinary power densities it gives us – with ambient energy is the stuff of science fiction. There is simply no substitute for cutting back.'[320] Julia Olmsted of the Land Institute in the US concurs: 'Pushing biofuels at the expense of energy conservation today will only make our problems more severe, and their solutions more painful, tomorrow.'[321]

But it can't be verified anyway to what extent a tree plantation or other biotic project 'compensates' for fossil fuel use.

Why can't it?

The problem – as described in Chapter 1 – is that above-ground biotic carbon and below-ground fossil carbon are connected to the atmosphere in different ways. Geologically, socially, politically, biologically and climatically, fossil carbon can't be equated with biotic carbon.

These differences are so great that they make nonsense out of the carbon market's claim that tree plantations or similar schemes 'sequester' carbon on the earth's surface in a way that is quantifiably comparable to the way coal and oil 'sequester' carbon underground. 'Sequestering', after all, means separating, and there are many degrees of separation. The carbon in a cigarette, in the fluid in a lighter, in grass or a tree trunk, in furniture or paper, in the top seven inches of soil, in coal deposits a kilometre underground, in carbonate rock dozens of

kilometres beneath the surface – all are separated from the atmosphere, but in different ways, for different average time periods, and with different risks of the carbon being released unexpectedly into the atmosphere. While fossil carbon flows into the biosphere/atmosphere system are pretty much irreversible over non-geological time periods, those from the atmosphere into the biosphere are easily reversible and not so easily controlled. A tonne of carbon in wood is not going to be 'sequestered' from the atmosphere as safely, or as long, as a tonne of carbon in an unmined underground coal deposit.

You mean that a tree plantation might burn.

Or it might be made into paper that will wind up in landfill and degenerate into greenhouse gas, or be made into furniture with a lifespan of only 50 years. Or it might be cut and left on the ground to rot by angry local villagers.

But surely carbon traders know this.

Of course. They acknowledge that one tonne of carbon in a tree is climatically not the same as one tonne of carbon in a deep coal deposit. But they hope that fossil carbon and biotic carbon can be made comparable by taking the amount of carbon in wood or soil and multiplying it by some fudge factor that takes into account its impermanence and the complexities of carbon circulation in the aboveground carbon pool.

So, say, five tonnes of carbon to be sequestered in trees by a carbon project established today would be assumed to be 'climatically equivalent' to one tonne of carbon left in coal deep underground.

Something like that. There are all sorts of schemes for applying discounting formulas or 'risk-spreading' factors to sequestration credits based on how long trees survive. There are all sorts of proposals for making sequestration credits temporary or available only for rental, insuring trees against fire, and so forth. Means have also been suggested for identifying and quantifying precisely how much carbon 'leaks' from various kinds of biotic projects (through fires, soil erosion, fossil emissions from transport required for the project, evictions leading to forest encroachment elsewhere, etc.).[322]

None of these methods work, however.

Why not? What's the problem?

You might remember that Chapter 1 introduced Frank Knight's distinction between risk – a situation in which the probabilities of

everything that can go wrong actually going wrong are well-known – and uncertainty – in which they aren't.

The trouble with 'carbon sink' projects that attempt to commensurate biotic with fossil carbon is that, to do so, they have to confuse uncertainty with risk – and try to convert the one into the other.

But that's not all. These projects also confuse risk with ignorance – a situation in which not even all the things that can go wrong are known. And, like other carbon-saving projects, they confuse risk with indeterminacy, which applies in situations in which comparison with counterfactual scenarios makes the calculation of probabilities inappropriate.

Hang on a minute. Let's start at the beginning. What do you mean when you say carbon sink projects confuse risk and uncertainty?

In order to derive the single number the market requires, carbon sink accountants have to look at all the things that might result in carbon being released from trees into the atmosphere and calculate their probability. But they can't do this.

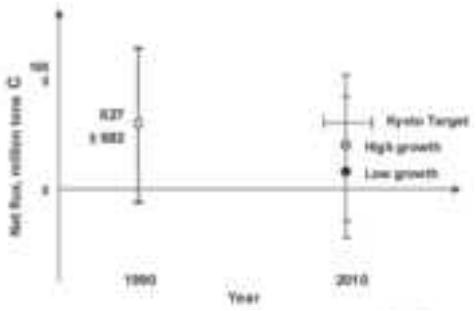
Why not?

Straightforward inadequacy of data is one obstacle. To get an idea of the size of the problem, consider one detailed study done by the respected International Institute for Applied Systems Analysis (IIASA). According to the study, mean net Russian carbon balance in 1990 (including flows into and out of the biosphere) can be pinned down only to the range of minus 155 to plus 1209 million tonnes per year. That swamps probable changes in total Russian carbon flux balance between 1990 and 2010, which are expected to be only 142 to 371 million tonnes (Figure 7).[323]

The IIASA concludes that knowledge of carbon flows among the atmosphere, biosphere and lithosphere is inadequate 'to form the basis for…any viable trading scheme.' That makes the Kyoto Protocol 'completely unverifiable' and a 'cheat's charter'.[324] Climatologist R. A. Houghton, similarly, has suggested carbon errors 'as large as 500 per cent in the forest inventories of northern mid-latitudes'.[325]

Figure 7. Posssible Range of Carbon Fluxes in Russia

Source: IIASA



By the same token, estimates of carbon sequestration rates in China's forests have recently been found to differ by up to 89 per cent[326] and in a pine forest in The Netherlands by 46 per cent,[327] depending on the method used. In 2006, in addition, it was revealed that pine plantations in the southern US were responsible for large increases in carbon dioxide emissions, since they were replacing hardwood or indigenous pine forests.[328] World methane sources have meanwhile been found to be uncertain by '20 to 150 per cent.'[329] In 2001, the UK's Royal Society cited an 'urgent need' to reduce uncertainties before land carbon sinks are used.[330]

Similarly, although some of the mechanisms that will affect the ability of trees to sequester and store carbon as the world warms up are known, the probability that any particular wooded region will maintain any given carbon balance over the next 50 or even 10 years can't be calculated.[331]

With regard to many such uncertainties, it's possible, to borrow the words of economist Douglass North, to 'acquire more knowledge and therefore convert uncertainty into risk'. When it comes to ignorance, however, 'one not only does not have a probability distribution of outcomes, but (using a Keynesian definition) one may not even know what the possible outcomes are, much less have a probability distribution of them'.[332]

For example?

For example, the past decade of research has provided continual surprises about how carbon in the biosphere affects climate, and vice versa, and how nonlinear and unpredictable relations can be between the two:

- Since the turn of the century, evidence has been emerging that possible climatic 'tipping events' such as the rapid release of greenhouse gases from permafrost, peat, ocean floors or dried-out tropical or boreal forests could be as unpredictable in their timing as in their impacts.[333] Meanwhile an enormous 'missing sink' in the biosphere has yet to be definitively located.[334]
- In 2000 scientists were startled to learn that the heat absorbed by dark-coloured tree plantations in Northern regions might cancel out their ability to absorb carbon dioxide.[335] A review article in *Science* warned that unanticipated 'feedback effects between carbon and other biogeochemical and climatological processes will lead to weakened sink strength in the foreseeable future.'[336] The possibility was mooted that that lengthening of dry seasons could abruptly result in catastrophic releases of carbon through fires in Amazon, pushing temperatures up 6–8 °C in 100 years.[337]
- In 2002, scientists warned that soils' or forests' ability to function as sinks under different conditions is nonlinear and 'limited.'[338]
- In 2004, experiments called into question the effectiveness of increasing the oceans' uptake of carbon by seeding them with iron, demonstrating that the organic carbon increased by the technique is not transferred efficiently below the permanent thermocline.[339] Global warming was shown to intensify insect infestations that can damage the carbon-storing ability of forests.[340]
- In 2005, new research suggested that carbon releases from soils in a warming world may 'be even stronger than predicted by global models.'[341] It was then revealed that since 1978 there had been huge surprise carbon releases from warmed soils in the UK.[342] New research showed that in many circumstances 'creating carbon offset credits in agricultural soils is not cost effective because reduced tillage practices store little or no carbon.'[343] Reduced-tillage soil carbon sequestration was found to result in unexpected releases of nitrous oxide, a powerful greenhouse gas.[344]
- Also in 2005, an ensemble of general circulation models assuming a doubling of levels of atmospheric CO_2 and a selection of conditions considered plausible by experts showed that the range of possible warming (and thus effects on carbon-storing ecosystems) was far greater than expected (from less than 2 to more than 11.5 degrees Celsius).[345] Unexpected carbon dioxide releases from biological matter in Amazonian rivers were traced for the first time.[346]

'It's a working principle of the Head Bureau that the very possibility of error must be ruled out of account. This ground principle is justified by the consummate organisation of the whole authority, and it is necessary if the maximum speed is to be attained…Is there a Control Authority? There are only control authorities. Frankly it isn't their function to hunt out errors in the vulgar sense, for errors don't happen, and even when once in a while an error does happen, as in your case, who can say finally that it's an error?'

'The Superintendent' in Franz Kafka, The Castle, *1926*

- In early 2006, climate researchers were stunned when new research revealed terrestrial plants emit methane, a greenhouse gas, under normal growing conditions through mechanisms that are as yet mysterious.[347]

There's no reason to expect such surprises are over. And any of them could play havoc with the possibility of doing the accounting that a market in credits from sinks projects would require.

Even worse news for the carbon market is the fact that setting up a measurable equivalence among emissions and biological sequestration would require quantification of the effects of social actions and institutions that mediate carbon flows. Carbon transferred from underground to the atmosphere enters not only the biosphere but also social and cultural spheres. Physical actions (for instance, planting biomass for power plants) bring about social effects (for example, resistance among local farmers, diminished interest in energy efficiency among investors or consumers, loss of local power or knowledge), which in turn bring about further physical effects (for instance, migration to cities, increased use of fossil fuels) with carbon or climatic implications. Calculating how much carbon a new tree plantation actually 'offsets' would require not only looking at soils and adjacent plots and streams, but also estimating how much the plantation has delayed the adoption of a technologically different energy-generation path on the part of carbon credit buyers, observing the 'carbon behaviour' of farmers evicted from the plantation site and their descendents for unspecifiable periods of between 42 and 150 years (estimates of the atmospheric lifetime of carbon dioxide emissions vary),[348] and so forth. No basis exists in either physical or social science for deriving numbers for the effects on carbon stocks and flows of such social actions.[349] 'Risk' models and what Douglass North calls the 'static theory' of orthodox economics are simply unhelpful in these circumstances 'of continuous change in many dimensions,' including 'change in the social structure and behaviour of human beings'. [350]

Reality and fantasy

What effect have concerns about the credibility of these carbon-saving projects had?

Carbon sink projects like plantations had a rough ride from the beginning. A majority of environmentalists and NGOs have opposed them strongly in a stream of declarations and position papers,[358] and some governments have also been intermittently sceptical. The Verification Research, Training and Information Centre stated unequivocally in 2000 that forestry and land use 'must not be used to meet emissions

Carbon Offsets and the Ghost of Frank Knight

Frank H. Knight (1885–1972), a University of Chicago economist recognised as one of the deepest thinkers in 20th century US social science, is famous for his distinction between *risk* and *uncertainty*.[351] Although he could never have anticipated all the ways it could be applied, Knight's 1921 distinction helps explain why it's confused to put any faith in a market for emissions credits generated by carbon-saving projects.

Risk, in Knight's sense, refers to situations in which the probability of something going wrong is well-known. An example is the flip of a coin. There is a 50–50 chance of its being either heads or tails. If you gamble on heads, you risk losing your money if it turns out to be tails. But you know exactly what the odds are.

Uncertainty is different. Here, you know all the things that can go wrong, but can't calculate the probability of a harmful result. For example, scientists know that the use of antibiotics in animal feed induces resistance to antibiotics in humans, but can't be sure what the probabilities are that any particular antibiotic will become useless over the next 10 years.

Still worse, as Knight's successors such as Poul Harremoës and colleagues have pointed out,[352] are situations of *ignorance*. Here you don't even know all the things that might go wrong, much less the probability of their causing harm. For example, before 1974, no one knew that CFCs could cause ozone layer damage. Obviously, this ignorance would have invalidated any attempt, at the time, to calculate the probability of ozone depletion.[353] Here, as with uncertainty, talk of 'margins of error' is inappropriate.

In situations of *indeterminacy*, finally, the probability of a result cannot be calculated because it is not a matter of prediction, but of decision. For example, it might be 'implausible' for subsidies for fossil fuel extraction to be removed within five years, but you can't assign a numerical probability to this result, because whether it happens or not depends on politics. In fact, trying to assign a probability to this outcome can itself affect the likelihood of the outcome. In such contexts, the exercise of prediction can undermine itself.

Problems posed by risk, uncertainty, ignorance and indeterminacy each call for different kinds of precaution. Risk fits easily into economic thinking, because it can be measured easily. Uncertainty, ignorance and indeterminacy, however, call for a more precautionary and flexible, and less numerical, approach.[354]

Take the carbon credits to be generated by tree plantations. If these credits were threatened by nothing more than risk, calculating techniques associated with insurance or discounting would be enough to create a viable commodity. You could insure carbon credits from a plantation just as you take out fire insurance for a building. If you knew the margin of error associated with a carbon calculation, you could play it safe by applying a discount factor.

But such credits are subject not only to risk, but to uncertainty, ignorance, and indeterminacy as well. For example:

- How long will plantations last before they release the carbon they have stored into the atmosphere again, through being burned down or cut down to make paper or lumber, which themselves ultimately decay? This is not simply a risk, in Knight's sense, but involves uncertainties and ignorance that can't be captured in numbers. For example, it is still not known what precise effects different degrees of global warming will have on the cycling of carbon between different kinds of trees and the atmosphere.
- To what extent will plantations affect the carbon production associated with neighbouring ecosystems, communities, and trade patterns? Again, uncertainty and ignorance, not just risk, stand in the way of answers.
- How many credits should be subtracted from the total generated by plantations to account for the activities that they displace that are more beneficial for the atmosphere in the long term, for example, investment in energy efficiency or ecological farming? No single number can be given in answer to this question, since 'it is inherently impossible to verify what would have happened in the absence of the project'.[355] That is, the answer is indeterminate.

Uncertainty, ignorance and indeterminacy are three reasons why it's not ever going to be possible to trade trees for smoke. By mixing up 'the analytically distinct concepts'[356] of risk, uncertainty, ignorance and indeterminacy, schemes such as the Clean Development Mechanism and Joint Implementation have blundered into what Knight would have called a 'fatal ambiguity'.[357] In this case, the fatality is the very climate commodity that carbon credit markets hoped to deal in.

reductions commitments' since changes to carbon stocks will 'rarely be verifiable.'[359] In the end, despite industrialized countries' efforts, credits from forest conservation projects were not allowed into Kyoto Protocol markets[360] and carbon sink project credits barred from use in the EU ETS, though they remained prominent in the Protocol.

However, the fundamental impossibilities of carbon-sink credits haven't ever been faced squarely by business, UN specialists, or most governments.

For example, during its deliberations on land use, an Intergovernmental Panel on Climate Change committee[361] stubbornly professed high confidence in certain global estimates of biotic carbon fluxes despite its being pointed out that estimates of net global terrestrial carbon uptake had a factor-of-five error bar (200 million tonnes give or take a billion tonnes). Similarly, because acknowledging the huge error bars surrounding estimates of tropical deforestation would

have undermined the possibility of generating CDM credits through 'avoided deforestation', the existence of the bars was referred to only in a footnote. When delegates discovered that the IPCC panel had changed already-approved estimates regarding sequestration by factors of up to 10 times in a way that made biotic carbon sequestration seem more plausible, panel chair Robert T. Watson offered the excuse of a 'simple typing mistake'. Throughout, IPCC scientists have been careful to avoid putting themselves in a position in which they might be forced to assess carefully the threat various risks and uncertainties pose to the Kyoto market's accounting system.[362] The carbon-trading tail was wagging the scientific dog.

'The Kyoto Protocol to the UN Framework Convention on Climate Change may be the most important economic agreement penned in the 20th century.'

Aaron Cosbey, Royal Institute of International Affairs, London

The wagging has continued. Recently, several European governments, desperate for cheap credits, have let slip that they plan to try to allow carbon sink credits back into the EU ETS. In addition, carbon sink credits continue to be popular in the voluntary market. And there has recently also been a renewed push to include forest conservation projects in the CDM.[363]

But maybe these governments and their expert advisers just don't understand the issues.

It's unlikely that's the entire explanation.[364] Trading advocates such as Michael Grubb are very clear that it is 'impossible' to measure or define the climatic difference between with- and without-project scenarios. It's just that they later backtrack to the position that it's merely 'difficult'.[365] In this same way, another expert admitted that carbon savings 'cannot be measured' only later to slip into the claim that 'accurate' or 'inaccurate' measurements can be made.[366]

Baselines that are at first admitted to be 'inherently impossible to verify' are often then treated as merely imprecise, with error bars of, say, '45 per cent in either direction' that can be 'managed' by 'putting in place safeguards and taking a conservative approach'.[367] In 2003, carbon project proponents were forced to admit that some projects that had been CDM candidates – and rejected for being business as usual – were indeed going forward without carbon money. The response from some trading proponents was that even if such projects were not business as usual 'at the time of application,' perhaps they became so later – or that perhaps it was only initial CDM interest that enabled them to find the finance that allowed them to proceed.

Similarly, many carbon consultants at first denied the need to quantify socially-mediated carbon effects of CDM projects, or protested that it was 'not their job' to do so.[368] Others tried to float the idea that (for example) the indirect and long-range effects of establishing

subtropical carbon plantations on timberland management in temperate regions could be satisfactorily quantified years in advance.[369] The IPCC's panel on land use once tied itself in knots trying to figure out how carbon credits might be given out for good conservationist policies. Eventually the panel decided that since 'quantifying the impact of policies themselves is unlikely to be feasible', measurement attempts should confine themselves to the apparently easier task of finding out how much carbon is taken up in specific projects. This, of course, landed them back in trouble, since the emissions baseline of any given project will vary under different policies.

But surely reality must be catching up with these fantasies of quantifying the unquantifiable?

Yes, but it's taking a while. Because the job of measuring the climatic benefits of carbon-saving projects is permanently impossible, the more seriously experts try to carry it out, the more complicated and fanciful – and hard to untangle – their techniques get.[370] Like rogue trader Nick Leeson trying to cover his tracks at Barings Bank, carbon consultants pile complexity on complexity in an ultimately fruitless attempt to evade the inevitable reckoning. That, of course, jacks up the 'transaction costs' of doing the projects.[371]

Sequestering Carbon or Fiddling Data?

In 2005, a template document for BioCarbonFund project developers to use to estimate sequestration rates was posted on the World Bank's carbon finance website. Examples were helpfully provided to illustrate how to fill in certain fields.

In the field 'contact (preferably email)' appeared the sample entry

'fred@data_fiddling_Inc.jail.com'.

Small projects lose out

The escalation of transaction costs is one reason that community-friendly renewable-energy carbon projects that generate few credits lose out. Particularly threatened are CDM projects attempting to compensate for less than 50,000 tonnes of CO_2-equivalent emissions per year.[372] Transaction costs for some prospective micro-schemes would run to a prohibitive several hundred Euros per tonne of CO_2 equivalent, at a time when the average price of CDM credits is running at less than €7.

As a result of this and other factors, the CDM is dominated by big, non-renewable projects that generate a lot of cheap credits but are not leading to structural change – in particular a handful of schemes to capture and destroy greenhouse gases called HFC-23 and N_2O. HFC-23 (a by-product from the manufacture of HCFC-22 and a substance used in air conditioners and refrigerators) is an extremely potent greenhouse gas estimated to be 11,700 times as climatically damaging as carbon dioxide. N_2O, another very harmful greenhouse gas, is emitted during the industrial production of adipic acid, a raw material for nylon.

The Clean Development Mechanism (CDM) 'is not encouraging companies to devote funds to renewable energy sources… to the extent…hoped.'

Wall Street Journal, 11 August 2005

Capturing and destroying the two gases is relatively convenient and easy. You do it all in one place – the factories where the gases are generated. The technique is uncomplicated, politically speaking – you just bolt extra bits of machinery onto an existing plant. And, because these HFC-23 and N2O are so potent climatically, the dividends are huge.

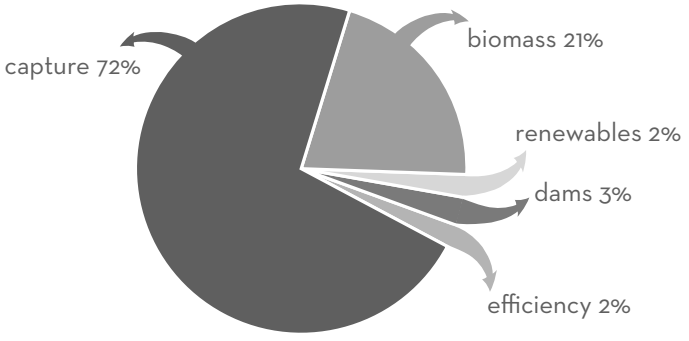
Could you give an example?

The Gujarat HFC-23 project in India, set up to supply credits to Japan, will prevent the emission of only 289 tonnes of HFC-23 annually. Yet because HFC-23 is such a potent greenhouse gas, this single quick fix will yield a whopping 3 million carbon credits per year, more than double the yield of all 20 CDM renewable energy projects registered with the CDM by May 2006. As of the same date, a single HFC-23 decomposition project, the Shandong Dongyue scheme in China, represented 19 per cent of all the credits generated under CDM. A consortium of Japanese, Italian and Chinese partners is meanwhile investigating a project spread across 12 HCFC-22 plants in China that would yield 60 million credits a year from 2008. Just seven of the 265 projects registered by August 2006 accounted for nearly three-quarters of all CDM credits. All were gas capture projects.[373] Renewable energy projects make up only 2 per cent of CDM credits (see Figure 8). The current proportion of world market investment in renewable energy or energy efficiency due to the CDM – also a mere 2 per cent – can only shrink.

Even so, the cost and inconvenience of having to come up with carbon accounting documents irritates business, Northern governments, and agencies such as the World Bank, who want as many cheap credits to be flowing into the market as fast as possible so that fossil fuels can continue to be burned at their accustomed pace. In 2005, for example, the World Bank pushed for the CDM Executive Board to be sidelined, claiming it was being too meticulous about reviewing methodologies at a time when thousands of projects had to be approved in a hurry. As a result, the pressure is on technocrats and consultants

Figure 8. Share of Total Registered CDM Credits Generated by Project Type, May 2006

Data analysis by Adam Ma'anit, Carbon Trade Watch



to simplify or streamline carbon accounting procedures as much as possible – for example, to come up with standardised techniques for validating projects *en masse* to save on costs.[374]

While 'there were high hopes that the CDM would usher in climate-friendly foreign direct investment…this remains largely to be seen.'[375]

R. A. Alburo Guarin, Development Bank of the Philippines

Organisations attempting to develop higher-quality CDM projects are frustrated for different reasons. Emily Tyler of the South African-based organisation SouthSouthNorth concludes that 'the CDM actually adds little value (indeed, it adds costs) to the very sorts of projects it was designed to encourage'. Tyler claims that what with its credit prices, contract terms, and transaction costs, the CDM adds 'no financial value' to 'the project types which most closely fit the CDM's avowed objectives'. She suggests that good-quality projects will be able to break even only by bypassing the bureaucracy required for quality control at the CDM, seeking extra donor funding, and selling credits on the higher-priced voluntary market to offset emissions from corporate travel, conventions, personal lifestyle and so forth.[376]

The catch is that the simpler, faster and more standardised carbon accounting procedures get, the less possible it is to justify the claim that the projects have anything to do with climate, and the more 'free-rider' credits are created for companies seeking subsidies for their existing operations.[377] It's an irresolvable dilemma – and one which, once again, was already familiar from the US, where attempts to reduce the risk of 'paper credits . . . increased transaction costs to a point where many trades were discouraged'.[378]

A side issue?

OK, I can see that offsets don't work. But surely offset credits are only a minor part of carbon trading – so minor that we can perhaps just ignore them?

It's not so easy. Some countries have contemplated using carbon credits bought from abroad to cover as much as half their (already minimal) emissions reduction obligations under the Kyoto Protocol. Countries such as Japan, Canada, Spain, The Netherlands, the UK, France, Sweden and Italy are expected to be among the biggest buyers.

In October 2005, one London financial consultant went so far as to proclaim that the EU carbon market was 'betting the house on CDM/JI credits.' So keen is Japan on gaining access to foreign carbon credits, meanwhile, that it is giving Japanese companies 50 per cent of start-up investment costs for CDM projects, as well as 50 per cent of validation and legal documentation costs, together with other subsidies for feasibility studies and design documents. A World Bank official has claimed that Northern countries as a whole will need to find between 750 and 2,200 CDM projects in the next few years, or on the order of 1.4 billion tonnes of credits. Only 265 projects had been officially registered by August 2006, accounting for only about 84 million credits, and Northern governments and corporations alike are desperately pushing for more to be produced.

'It is widely recognised that…[the end-of-pipe developments that so far constitute the bulk of CDM projects] have no direct development benefits.'

Holm Olsen, United Nations Environment Programme

The fact that offset credits form a large part of the carbon market's volume makes them central to carbon trading's overall problems. Carbon credits contaminate any trading system they are used in by adding another layer of unverifiability to the hybrid commodity being trafficked.

All right, maybe credits from carbon projects are important in the market. But at least you have to admit that carbon sink projects, which surely have the most technical problems of all, are only a trivial part of the market. After all, they constitute less than 10 per cent of the credits from CDM projects. So perhaps we can afford to be relaxed about the fact that they aren't doing any verifiable good for the climate.

Carbon sinks credits may be a small part of the *market*. But, as can be seen in the case studies of the next chapter, they have a disproportionate effect on *land* and people's use of it. Remember how many trees and how much territory is needed in order supposedly to 'offset' a minimal amount of emissions. With sinks, it doesn't take many credits to damage people's lives.

Which perhaps makes this a good time to turn to the topic of the particular property rights conflicts associated with carbon saving projects.

Ownership again

I thought we already talked about this.

No, our previous discussion was about the difficulties created by the need of *emissions trading* to create and distribute property rights. Carbon-saving *projects* such as those created under the Clean Development Mechanism raise property rights problems of their own. As the next chapter will document, the new carbon dumps that large polluters need usually have to appropriate someone else's land, someone else's water, or someone else's future. Conflicts over ownership are inevitable.

Some of the easiest examples are carbon projects that involve tree planting.

Jayant Sathaye of the US's Lawrence Berkeley National Laboratory once observed breezily that anxieties about the rich cleansing their emissions by taking over the poor's land for forestry projects could be relieved simply by 'ensuring that the title to the land is separated from the title to carbon.'[379] The reality is not so simple. First, most plantations that are candidates for carbon finance are already in the hands of powerful corporations or state bureaucracies. Many of these corporations or bureaucracies are already embroiled in conflict with local people over their takeover of local land and water. In such circumstances carbon finance is likely to be viewed merely as another subsidy for an exploitative status quo. Second, land whose tree and soil carbon has been signed over to a utility is going to be less able to provide livelihood goods to local people.[380]

Carbon is not some unexploited 'extra' product that is simply lying around unused, waiting to be plucked and sold to fossil fuel users, with no other social effects. Its presence is intimately bound up with other uses of the land. Since, under the CDM, the land in question lies in the South, carbon plantation projects are likely to magnify existing North-South inequalities.

The case of bioenergy plantations presents an interesting case study. Bioenergy schemes are increasingly attracting carbon finance (including over 100 projects registered with the CDM by May 2006). Insofar as they are expected to replace a substantial percentage of the oil or coal used in today's industry and transport systems, however, they foreshadow a future in which vast tracts of land in the South are turned over to producing biofuel for export.

That raises the question of whether such plantations would be any more successful for the countries that establish them than traditional agricultural export monocultures, given familiar problems of

overproduction, declining terms of trade, failure to diversify the production base, land degradation and so on.

Biofuel plantations also raise the question of ownership in a broader and more far-reaching sense. Industrially-produced agricultural commodities such as sugar, soya, rubber, bananas, maize, coffee, cotton, pulpwood and palm oil have already, in a sense, dispossessed millions in the global South. Why should biofuels be any different?

I thought I was supposed to be the one asking the questions.

Examples like biofuels also remind us that carbon projects not only take over land and water, but also stake a claim on the future. They divert not only present but also future resources to licensing and prolonging fossil-fuel use.

Plantation of oilseeds for biofuel.

How does that work?

The UK's Carbon Neutral Company (CNC) presents one clearly documented example. CNC sells carbon credits on the unofficial, 'voluntary' market to consumers, claiming thereby that it can make their activities 'carbon-neutral'. In return for a small amount of extra funding to woodland owners or forestry managers for tree plantings that are taking place already, CNC assumes ownership of the associated carbon rights, which are then sold on to customers at a huge mark-up.

According to one 2001 contract, a forestry enterprise established on public land in North Yorkshire in the UK agreed to 'allocate and assign' to CNC (then called Future Forests) and not 'to anyone else' the 'greenhouse gas absorption capacity of the tree biomass on the land

identified in the plan for 99 years from the date you countersign this letter.' While the agreement specified that CNC did not thereby acquire ownership of 'individual trees', it did 'entitle' CNC to 'individual separable enforceable…carbon sequestration rights in the land.' The land could not be sold during that 99-year period unless the buyer also agreed 'to observe the terms of this agreement':

> …this agreement shall be treated as a burden on the land and will accordingly be binding (so far as legally possible) on your successors in title to the land.[381]

In 2002, meanwhile, the Western Australian government introduced a Carbon Rights Bill governing biological carbon sequestration as a 'first step' toward setting up a carbon trading regime. The bill defined a 'carbon right' as separate from other rights in land and specified that it 'can be owned by a person unrelated to the owner of the land'.[382]

But what do the British voluntary offset market and domestic Australian trading arrangements have to do with the international Kyoto offset market?

They work by the same principles – and appropriate people's land and futures in similar ways. And they can provoke some of the same reactions.

Local people in Minas Gerais, Brazil, for example, explicitly oppose the way a plantation charcoal project helps obliterate possible futures they wish to build:

> The argument that producing pig iron from charcoal is less bad than producing it from coal is a sinister strategy… . What we really need are investments in clean energies that at the same time contribute to the cultural, social and economic well-being of local populations… .[383]

Indigenous Peoples' organisations were among the first to spot the land grabs and mortgaging of the future involved in Kyoto's carbon sink projects. The Indigenous Peoples' Statement made at the Ninth Conference of the Parties to the UNFCCC in Milan in December 2003 noted that:

> Sinks projects do not contribute to climate change mitigation and sustainable development. The modalities and procedures for afforestation and reforestation project activities under the CDM do not respect and guarantee our right to lands, territories, and self-determination.[384]

In May 2006, representatives of all of Ecuador's indigenous nationalities, meeting at Puyo in the Ecuadorian Amazon with other indigenous groups and national and international NGOs, declared:

> We reject the use of the Kyoto Protocol's so-called Clean Development Mechanism in projects affecting the communities, such as hydroelectric dams, monoculture tree plantations and others. We reject the signing of further contracts in our communities for the sale of environmental services with national or international NGOs, municipalities or individuals. We exhort CONAIE and CONFENIAE [confederations of indigenous peoples in Ecuador] to submit the corresponding complaints to the courts [and] to have punitive measures taken against the notaries, contract promoters and NGOs that participate in these activities.

We've been talking about who owns the land and water used by carbon projects. But who owns the carbon credits produced by these projects?

It's not always clear. As late as 2004, Baker and McKenzie, an international law firm specialising in carbon trading, was still asking, 'Who is entitled to legal ownership of emissions reductions?'

> Could legal title to emission reductions [sic] which are being traded be challenged by another party to the project (i.e., the lessor of the land, the government, another shareholder in the project) or limited by concession arrangements?... What if foreign involvement in a project is limited to the purchase of credits – would this constitute a transfer of 'property rights' to the foreign investor?[385]

Only in 2005 did the Chinese government, to take one example, clarify what percentage of the benefits from the sale of carbon credits it would take and how much it would leave to implementing enterprises.

Not surprisingly, businesses interested in buying carbon credits are obsessed with property rights. While EU emissions allowances are 'real property', noted one Dutch banker recently, CDM credits 'don't have such a solid status yet'. As international commercial lawyers gear up for disputes over title, one European carbon fund manager was heard to remark in October 2005 that 'there are just not enough guarantees . . . I'm not going to spend my life in the court of Belo Horizonte to get my credits. We're placing bets here. CDM credits will always be discounted.'

What's the problem? People who invest in carbon projects should own the carbon savings. And everybody else should just accept this.

People who have arguably 'invested' for generations in land and other goods used for carbon projects yet do not own, and cannot sell, the credits they produce, are likely to take a different view. Indigenous peoples, for instance, may have preserved forests and soils for

centuries, yet are likely to have no share in the carbon profits that a formal landowner can reap.

Similarly, indigenous communities, environmental groups, policymakers and even national governments have 'invested' in, and continue to invest in, innumerable carbon-saving activities such as preventing oil extraction or maintaining energy-efficient activities in their territories. As Hermann Ott and Wolfgang Sachs point out, 'a country which, for reasons of equity, promotes biodiversity habitats, resource-light production, livelihood agriculture or the institution of community rights, may already avoid a great deal of emissions,'[386] yet may not own, or be able to sell, carbon credits for doing so. Douglas Korsah-Brown of Friends of the Earth Ghana once argued along similar lines that while Southern countries have effectively 'loaned their ecological space to developed countries', they 'have received no credit for avoiding emissions to date' and 'should be rewarded for not having adopted dirty technology in the first place'.[387]

Well, but you can't just give credits to somebody for not *doing something.*

The Kyoto Protocol does it all the time. *All* CDM credits are generated by not doing something. Remember that every project has to show that it does not do 'what would have happened without the project.' Some even have 'avoidance' in their name.

Look, for example, at the Lages Methane Avoidance Project in Brazil, which was registered by the CDM board in April 2006. This project generates credits by *not* landfilling wood waste and burning it instead. Or, to take another example at random: Japan gets carbon credits from the Graneros Plant Fuel Switching Project in Chile, registered in July 2005, because the plant does *not* use a certain amount of coal or oil, having switched to gas instead.

If Japan gets credits for industries that do not use coal, and a Brazilian company gets credits for not leaving wood to decay, then Costa Rica should get credits for having prevented US companies such as Harken Oil from exploiting oil on its territory.[388] Indigenous communities should get credits for having won the revocation of fossil fuel concessions in their territories.[389]

In fact, why stop there? Nepal should put in an application to the CDM to get credits for not building a superhighway system. Cameroon should get credits for not undertaking a space programme. Anybody in a Southern or Eastern European country should be able to generate credits for choosing to ride a bicycle instead of investing in a car.[390]

Stop being silly. Nepal was never going to build a superhighway system. Cameroon was never going to invest in a space programme. And presumably Costa Rica would have stopped Harken Oil from drilling for reasons other than the promise of carbon credits. How could you possibly verify and measure the carbon credits from such projects?

As demonstrated above, the CDM already cannot verify how many credits its projects generate, and for just the same reason: it can't prove that its projects are not business as usual. In accounting terms, there should be no difference between them and these other speculative projects. The silliness is all on the side of the CDM and other carbon-offset programmes themselves. To cite these hypothetical examples is only to throw that silliness into sharper relief.

In fact, in the case of indigenous communities and the Costa Rican government preventing oil exploitation, measurement is arguably a good deal easier than in the average CDM project, involving only quantification of the unexploited oil deposits.

What qualifies you to be a carbon credit owner, in sum, is not that you are saving carbon. It is, rather, that you have the money to invest in various piecemeal technical fixes in specific industries and to hire consultants to calculate and 'verify' carbon credits, crunch numbers, fill in forms, monitor projects and so on. Carbon credits go to well-financed, high-polluting operations capable of hiring professional validators of counterfactual scenarios. They do not go to non-professional actors in already low-emitting contexts or social movements actively working to reduce use of fossil fuels. (See box, p. 61.)

Few rural communities in Northeast Thailand or the Peruvian Amazon, for example, are going to be able to afford the services of the expensive private carbon consultants designated by the United Nations – such as Norway's Det Norske Veritas, Germany's TUV, Britain's SGS or Japan's JQA – to document, 'validate' and 'verify' their community-friendly energy schemes, even if the UN encouraged such projects.[391] In the distribution of property rights over carbon savings, there's a clear bias in favour of wealthy corporations and governments and against communities, the poor, non-professionals and certain ethnic groups.

It hardly needs to be added that this prejudice – which often deserves the title of 'structural racism' – badly serves the cause of climatic stability. It reinforces a system in which, ironically, the main entities recognised as being capable of making 'emissions reductions' are the corporations most committed to a fossil-fuel-burning future, such as Shell or Tokyo Power, while indigenous communities, environmental movements and ordinary people acting more constructively

Who Owns Forest Carbon?

The United Nations has never been able to work out a convincing way of deciding who owns the carbon-recycling capacity of forests – and therefore who should be able to cash in on it in a carbon market.

Early in the Kyoto Protocol negotiations, the EU and some Southern countries were eager to prevent industrialised countries from using regrowth of their forests as an excuse for not reducing industrial emissions. They demanded that marketable biotic carbon assets be limited to those resulting from 'direct human-induced' carbon uptake, and not include 'natural fluxes'.

Awkwardly, this opened up the entire terrestrial biosphere to carbon property claims. Every part of the globe has been affected by human activity over millennia, from Australia's fire-moulded landscape to North America's forest mosaic.[393]

Not even the Intergovernmental Panel on Climate Change has been able to factor out 'direct human-induced' effects from 'indirect human-induced and natural effects' such as those due to enhanced CO_2 concentrations and nitrogen deposition. 'The phrase "human-induced"', it admits, 'has no scientific meaning'.[394] Hence it's been hard to identify which biotic carbon dumps should be regarded as belonging to human beings at all.

The IPCC's suggested way out – to define 'directly human-induced' activities arbitrarily as those resulting from the decisions of contemporary 'land managers', including, most obviously, professional 'afforesters and reforesters' – tends to exclude historical actors who often have better claims to conserving carbon.

As one of Tuvalu's negotiatiors once pointed out, a government or company that hires an aeroplane to scatter a few particles of fertiliser over its land-holdings could gain the right to claim credit for the carbon in the forests below, while indigenous and settler peoples who had a hand in the earlier shaping of such ecosystems – or farmers who happen to look after lands classified by experts as 'unmanaged' – might get no credit at all.[395] That would make property ownership pretty much entirely dependent on professional and economic status, together with technical measurement capability.

to tackle climate change are tacitly excluded, their creativity unrecognised, and their claims suppressed. As Janica Lane and colleagues observe, 'Most climate change aid goes to current or future polluters in developing nations, while people conducting relatively climate-friendly practices are ignored.'[392]

In other words, carbon offset trading is treating the worst climate offenders as climate heroes, while failing to support many of those who are addressing the problem at its roots.

Exactly. And a final injury of carbon offset trading is that, by licensing more pollution in already-polluted areas, it reinforces a pattern of inequality worldwide.

How does that happen?

Some of the biggest buyers of carbon credits are industries that badly pollute their local communities – utilities, oil refineries, chemical firms, pulp and paper companies and the like. In fact, throughout the world, polluting industries and poor communities suffering discrimination of various kinds tend to be found together, for reasons including weak pollution zoning restrictions and low real estate costs. Cheap carbon offsets help allow these industries to go on damaging their local environments.

But the credits they buy are carbon dioxide credits. Carbon dioxide is not a toxic pollutant in itself.

No, but, as mentioned earlier, the same processes that produce carbon dioxide also produce a lot of co-pollutants that are toxic. By helping industries to go on producing carbon dioxide, cheap carbon credits also allow them to go on producing a range of toxic substances.

Worse, a polluting industrial installation often gets a new lease on life by buying cheap carbon credits from a project that damages the lives and livelihoods of local people elsewhere. In this way, the trade in carbon credits can use the oppression of local people whose land is being used for industrial plantations in Brazil, say, to prolong the oppression of other local communities in the vicinity of oil refineries or power plants in Europe. Communities that should be uniting in their battles for a transition away from the hydrocarbon economy are being pitted against each other by the trading system that pretends to offer a solution. In the future, it may even happen that an indigenous community fighting an oil company's exploitation of its territory will find itself at odds with another indigenous community down the river providing carbon sink credits to the same company.

Once again, the experience of offset markets in the US should have provided some lessons for the carbon trade. In Los Angeles County, for example, minorities are more than twice as likely as Caucasians to be living in a census tract located within a one-mile radius of at least one large-capacity toxic site,[396] and a majority of facilities emitting toxic pollutants are in 'Hispanic-dominated' census tracts.[397] The Los Angeles RECLAIM offset trading programme described above reinforced this pattern.

How?

The pollution prevented by RECLAIM's programme of destroying decrepit cars would have been spread over a wide four-county region. But the industries that bought the resulting 'offsets' are densely clustered in only a few communities, or 'hot spots'. So the car 'offset' scheme effectively concentrated more pollution in communities surrounding stationary sources, particularly those associated with the four oil companies who were the biggest buyers of the offset credits generated by scrapping cars: Unocal, Chevron, Ultramar and GATX.

All these companies used their 'offsets' to avoid installing pollution control equipment that captures toxic gases and vapours released during oil tanker loading at their marine terminals, including benzene, which can cause leukaemia, anaemia, respiratory tract irritation, dermatitis, pulmonary oedema, and haemorrhaging.[398] The surrounding communities were overwhelmingly Latino, three of them populated between 75 to 90 per cent by people of colour (compared to a figure of 36 per cent for the entire South Coast Air Basin).[399]

Much of the historical pollution burden of these underprivileged communities was thus maintained through a programme advertised as 'controlling' pollution.[400] In a trade of like for unlike, the continued release of highly toxic chemicals into certain communities was exchanged for small area-wide reductions in much less toxic chemicals.

Nor is this case unique. A trading programme in the San Francisco area 'unfairly gave up toxic emissions reductions from a petroleum refinery in a community of colour facing high cancer risk, in exchange for credits from reductions in auto use throughout the Bay Area'.[401]

How offsets block change

If trading in carbon credits worsens the problem of hot spots, it also adds to the forces blocking the technological and social innovation needed to address climate change. Again, this is a pattern evident from 'offset' projects in earlier US pollution trading schemes that is being repeated in today's carbon-'saving' projects – including the Kyoto Protocol's CDM.

What's the US experience, then?

One example is, again, the RECLAIM pollution market set up in Los Angeles.[402] Beginning in 1997, the local air quality management authority offered to award marketable credits to businesses or individuals who repaired emissions-related components in high-emitting vehicles, bought clean buses or other vehicles, electrified truck stops and tour bus

stops to prevent engine idling, bought battery-operated lawn mowers and so on. Whether or not these 'offset' technologies are themselves regarded as innovative, they were used to relieve pressures on large emitters to make other, more substantial technological changes.

Similarly, as also mentioned above, 'offsets' used in the US Environmental Protection Agency's 'bubble' programmes removed big polluters' incentives to innovate to control their own emissions, usually through use of credits generated by an already-existing technology. Firms also claimed credits for shutting down emissions sources or for production slowdowns, even when such actions were undertaken for business reasons. Writing of such 'paper credits,' environmental lawyer David Doniger wrote in 1986 that 'in practice…there has been far more innovation in shell games and sharp accounting practices than in pollution control technology'.[403]

In a similar way, the Kyoto Protocol's credit-generating mechanisms – JI and CDM – are designed in a way that allows industries in the wealthiest countries to avoid or delay innovation in their own technological systems as long as they fund the installation of off-the-shelf technology in Southern or Eastern European countries.

These mechanisms have been a particular failure in promoting renewable energy, in which innovation is especially desirable. Older industrial plants whose emissions are supposedly 'compensated for' by carbon credits bought from abroad will more easily undercut newer, more efficient technology, reducing incentives for change. And in addition to failing to promote innovation in the North, they also fail to promote innovation in the South.

Why?

There are several reasons.

First, the more a Southern country makes it a matter of policy to promote renewable energy or climate-friendly technology generally, the harder it is for it to attract CDM projects. The more serious it is about weaning its technological structure off fossil fuels, the harder it becomes to prove that good projects would not have happened without the CDM.[405]

The CDM, in other words, gives governments perverse incentives for choosing the short-term benefit of CDM revenues aimed at plucking 'low-hanging fruit' over the long-term benefits of environmental policy promoting climate-friendly technological change. For example, high-level government bureaucrats in South Africa's Department of Mines and Energy have admitted that they have faced pressure from

Innovation, the Atmosphere and Economics

Because it allows the North to delay urgently-needed social and technological change, every block of carbon credits from the South has a long-term climatic cost.

Carbon accountants need to quantify such 'opportunity costs' when adding up the effects on the atmosphere of each carbon project. Logically speaking, that's a prerequisite for accurately calculating how many carbon credits a project should be allowed to sell.

However, no CDM project validators or verifiers ever make such calculations. No one has any idea how to figure out how much carbon a project will 'lose' by depriving a company in the North of an immediate incentive to innovate. Nor is it possible they ever will, although in the long term the amount could be enormous.

This failure of the carbon 'offset' market is only one example of the many paradoxes which result when conventional economic thinking is uncritically applied to issues such as climate change mitigation. As legal scholar Robin Paul Malloy explains, efficiency analysis 'is incapable of adequately addressing creativity because creativity is indeterminate.'[404]

the private sector not to make renewable energy targets too stringent, for fear future CDM projects will not be able to prove they are better than what would have happened otherwise.[406]

Pressures for holding off on innovation are increased by the fact that credit buyers and consultant validators seeking future contracts have incentives to postulate, and try to bring about, business-as-usual scenarios which are the highest-emitting possible, in order to make the projects that they back appear to be saving as much carbon as possible.

Second, some proposed CDM projects claim carbon credits simply for obeying the environmental laws of the host country. One example is a proposed project to divert the natural gas now being flared into the sky by Chevron, Shell and other corporations in Nigeria to a productive use. Flaring is already prohibited in Nigeria, and the companies have been paying a penalty for non-compliance.[408] Indeed, the Nigerian High Court recently affirmed that flaring is illegal and unconstitutional.[409] Another example is South African regulations that methane emissions from landfills be captured once they reach a certain level.[410]

Proponents of carbon projects often claim that they help ensure that environmental laws are obeyed. However, the prospect of carbon finance gives both host countries and project proponents incentives for ensuring that those laws – including those that create incentives for structural change and innovation to lower emissions – are normally

not enforced. The climatic 'balance sheet' for such projects would thus, logically speaking, have to be debited for the climate effects of the associated damage done to the rule of law in the host country. In addition to undermining important incentives for structural change and innovation, this type of proposed CDM accounting raises questions about the commitment of the international community involved in CDM projects, including the World Bank and Northern governments, to what the Bank calls 'good governance'.

Third, and perhaps most important, the cheapest and most secure carbon credits that the CDM has to offer – and thus the ones most in demand by industrialised countries – will be those, like the HFC-23 and N_xO projects mentioned above, that do the least to help develop a structure of renewable energy and transport in Southern countries.[411]

Many national-level CDM authorities 'do not care about additionality of CDM projects…There is a real risk of a backlash against the CDM if its sustainability performance does not improve.'[407]

Axel Michaelowa (CDM Methodology Panel) and Katharina Michaelowa, Hamburg Institute for International Economics

While such projects (assuming they would not have been implemented anyway) do carry environmental benefits, they are essentially only end-of-pipe add-ons to single, existing plants; could have easily been carried out through traditional regulation; and don't help bring about structural change in critical climate-related sectors such as energy or transport through research and development, technology sharing, training and so on.

As the US lead and sulphur dioxide programmes demonstrate, because this type of market-oriented project 'focuses solely on reducing a single pollutant by an exact date and a precise amount at least cost, techniques and practices that deliver multiple benefits – e.g., new ways of energy conversion, as well as conservation, and renewable forms of energy – are frozen out of the market'.[412]

As a 2004 overview of the CDM by the Organisation for Economic Co-operation and Development, a band of 30 industrialised countries, noted:

> [A] large and rapidly growing portion of the CDM project portfolio has few direct environmental, economic or social effects other than greenhouse gas mitigation, and produces few outputs other than emissions credits. These project types generally involve an incremental investment to an already-existing system in order to reduce emissions of a waste stream of GHG (e.g. F-gases or CH_4) without increasing other outputs of the system.[413]

Coal-bed methane schemes are another example of business-friendly projects that do have environmental benefits, but don't promote climate stability when part of a trading scheme. Gas capture projects in oil fields similarly contribute little toward the innovations needed for a transition away from fossil fuels, yet also yield conveniently large chunks of cheap carbon credits.

I don't agree with your criticism of projects that capture gas from coal mines and oil wells and then burn it off to generate electricity. Surely these are efficiency measures that need to be undertaken at every such installation. Why are you against them?

No one's against preventing this kind of waste. Considered on their own, such projects are needed and should have been done from the start. The difficulty comes when they become tradable for increased fossil fuel use elsewhere. As part of a trading system, they become not just much-needed efficiency schemes but also licenses for accelerated carbon-dioxide release.

We've been talking about what, from an environmental point of view, are admittedly rather dodgy schemes. But aren't there at least some renewable energy projects in the CDM?

There are a fair number, but they were never going to generate many credits. Often small capital- or labour-intensive greenfield developments that provide low rates of return,[414] are less able to shoulder the burden of the documentation, validation, ongoing monitoring and verification of emissions reductions required of CDM projects. An additional handicap for renewable energy projects, which have to pay more of their costs upfront than many other projects, is the commodity transaction model overwhelmingly followed by CDM and JI projects, in which credits are bought as they are delivered over a 10- or 21-year crediting period.[415]

HFC-23 and N_2O projects had a head start in getting their methodologies approved, too, and are likely to maintain their advantage over renewable energy projects for which carbon accounting is more cumbersome and tests of whether a project 'would have happened without carbon credits' are especially difficult to apply.[416] Significantly, none of the nine renewable energy projects being developed under the Dutch-funded CERUPT carbon-trading programme in 2004 was able to demonstrate that it 'would not have happened otherwise.'[417] Similarly, the large renewable-energy Darajat III geothermal project in Indonesia and the Zafarana wind farm in Egypt have failed to get their baseline methodologies accepted by the CDM due in part to their inability to demonstrate that they are 'additional'. Investment by Japan – whose Bank for International Cooperation provided a soft loan to Zafarana in breach of CDM rules against using overseas development aid money – has accordingly shifted more and more toward landfill gas and gas capture projects.

In short, no market system that prioritises price per unit of carbon credits will be of much good to renewable energy, as the World

Centre for Science and Environment

Bank, among others, recognised early on. Only months after the 2001 Marrakech Accords laid down the rule book for the CDM, the consultancy Ecofys had already concluded that there would be only a 'limited role for renewable energy projects under… Kyoto Mechanisms dominated by least-cost approaches'.[418] More recently, the World Bank explicitly called attention to the 'the non-economic' nature of the renewable projects in the CDM portfolio, noting that the current proportion of renewable energy projects is bound to diminish in the 'mature CDM market'.[419]

Among registered CDM project types, only energy efficiency schemes have produced fewer credits (less than 1 million tonnes of CO_2 equivalent) than renewables. Calculations by the World Wide Fund for Nature (WWF) show that the amount of financing expected to be mobilised by the CDM for renewable energy is a fraction not only of existing investment and Overseas Development Assistance (ODA) flows, but also of Global Environment Facility (GEF) financing for renewable energy. WWF estimates that the CDM will account for less than 0.5 per cent of the annual renewable energy market in Southern countries if current trends continue.[420]

When investors do put money into renewable energy schemes, they are treating them mainly as green decorations for portfolios dominated by conventional energy rather than as sober market investments. The Finnish government, for example, submitted four micro-hydro projects in Honduras to the CDM, yet their credit generation is so small – one project is claiming to generate only 9,000 tonnes of CO_2 credits over 10 years – that it is difficult to see how credit sales could even cover transaction costs.[421] Similarly, the minimum price tag for certifying a CDM project in South Africa – estimated at around 40,000 RAND/USD 6,300 – puts carbon finance out of reach of most small-scale renewable energy project developers.[422]

But don't the Southern governments hosting CDM projects want them to be of more long-term value to their peoples?

Some might like it to be that way, but that's not how the market works. If host countries started trying to enforce 'sustainable development' criteria, transaction costs would go up and their projects would be less likely to attract investment. Unsurprisingly, CDM host countries haven't been very insistent on promoting renewable energy or other 'high-quality' CDM projects capable of driving innovation and strategic change.

In sum, CDM is not a renewable energy promotion instrument or a 'sustainable development' fund. It identifies and funds low-cost

carbon credits rather than investments that drive strategic change in energy and transport.

Still, it must be better than nothing.

'A mechanism designed to promote climate protection,' as CDM expert Ben Pearson puts it, 'should be reducing the number of coal and oil projects, not providing them with a new revenue stream and diverting financing from renewable projects.' The technology the CDM promotes merely embroiders an overwhelmingly fossil-oriented approach to energy and transport. Nearly every institution that invests in the CDM market is investing far more in the fossil fuel market.

It's useful to return once again to the example of the World Bank. Many corporate investors in the Prototype Carbon Fund (PCF) – the Bank's flagship carbon fund – are in fact receiving far greater amounts of Bank financing for fossil fuel projects that *produce* emissions (Table 4).

Table 4

Corporation	PCF contribution for CDM and JI projects 1999-2004[423] (USD million)	Received from WB for fossil fuel projects 1992-2002 (USD million)[424]
Mitsui	17 [481]	1,807.5
BP	5	938.8
Mitsubishi	5	403.6
Deutsche Bank	5	165.6
Gaz de France	5	138.9
RWE	5	138.9
Statoil	5	242.3
Total	46	3,834.6

The involvement of BP and Statoil in the PCF is particularly notable given the ongoing financial support by the Bank's International Finance Corporation (IFC) for their efforts to open up the massive Azerbaijan oil fields for consumption in Western Europe and the US. In October 2003, BP and Statoil were part of a group of corporations who received USD 120 million from the IFC for development of the Azeri-Chirag-Guneshli oil fields in Azerbaijan. Greenhouse gas emissions from the oil produced by this project will be over 2,000 million tonnes carbon dioxide over 20 years. In November 2003, the IFC approved another USD 125 million for the Baku-Ceyhan pipeline between Azerbaijan and Turkey, whose investment consortium is again led by BP. An estimated three billion tonnes of carbon dioxide will be released to the atmosphere through the burning of the oil that will be transported by the pipeline.

Similarly, just five months after the PCF was launched in 2000, the Bank approved over USD 551 million[427] in financing for the Chad-Cameroon oil pipeline. The financing package for the pipeline came to about three times the capitalisation of the PCF, and the expected lifetime emissions of approximately 446 million tonnes of carbon dioxide[428] generated by the pipeline's oil amount to roughly three times the 142 million tonnes that will allegedly be 'saved' by PCF projects in total.[429]

Significantly, PCF investors get carbon *credits* from PCF projects, but no *debits* for their Bank-supported projects involving fossil fuel extraction or use.

Finally, technology 'transfer', CDM-style, has been implicated in technology *displacement* – in particular, displacement of superior low-carbon technologies (see Chapter 4, 'India – A taste of the future'). It is not as if, through the CDM, the North is somehow bringing technology to technology-free places. Promotional brochures may show shiny, seemingly benign technologies being peacefully 'transferred', but the technologies being disrupted in the process are typically less visible. 'Technology transfer' often also centralises political control.

'If the CDM continues to operate within the current policy perversity in which the Kyoto Protocol and CDM exist alongside massive North-South financial flows to fossil fuels, then it will fail.'[426]

Ben Pearson, CDM Watch

'Technology transfer' is a highly ideological phrase denoting a highly political process. When used with the CDM, it tends to stand for a pattern of fossil fuel-oriented corporate incursion that can exclude types of informal technology exchange between communities that are often more climate-friendly.

In general, the CDM is impeding constructive action not only in the North (where it allows government and industry to avoid investment in long-term change), but also in the South (where, by and large, it channels resources into non-renewable projects that sustain the fossil fuel economy).

But if we can't fix the damage the CDM has on the North's transition to a post-fossil era, maybe we can still fix the CDM in a way that helps the South toward more renewable sources of energy. What we need are standards that will tell buyers which CDM carbon credits come from responsible, renewable energy and energy efficiency projects that really do something for the climate and for people. Buyers could well stampede to buy these premium credits. Finally the market would start working for a liveable climate instead of against it.

Somebody's already thought of that idea. It's called the Gold Standard, and was developed by World Wide Fund for Nature and other NGOs in collaboration with governments, corporations and experts around the world.

The Gold Standard attempts to ensure that carbon credits are 'genuine,' 'credible,' and provide 'real emissions reductions' and 'real

Segments of the Baku-Ceyhan pipeline await assembly.

increases in sustainable energy investment'.[430] It claims to be able to do this by 'exceed[ing] the environmental standards demanded by the market regulator and governments', which it admits are unsatisfactory. Forestry and fossil fuel projects are excluded and projects must try to 'prove' once again that they are not 'business as usual' and that they have 'sustainable development' benefits.

Of course, Gold Standard credits cost more. But, it's argued, they help buyers avoid dodgy products.

Sounds perfect. Has the idea worked?

No. Why should it? It can't change the market fundamentals. The underlying dilemma remains: the harder you try to make your offset project have a positive long-term impact on climate, the more it will price itself out of the market. You can't have it both ways – good,

small projects and cheap credits. A few buyers may be interested in good Gold Standard projects as window dressing, but they can never become the main stock in trade at the CDM. But if the Gold Standard tries to accommodate business' wishes too closely, it risks a credibility already in question.

Thus one common business complaint against the Gold Standard is that it is too 'rigorous' to supply a steady stream of cheap credits. By the same token, 'good' Gold Standard projects – such as the Kuyasa scheme in South Africa – can't survive in the market and have to be propped up with large subsidies (see Chapter 4, 'South Africa – Carbon credits from the cities'). Gold Standard credits make up an insignificant fraction of the total CDM trade, and there are few expectations this will change in the future.

The CDM is 'not working.'

Gold Standard staff member

So there's no way around it. The carbon 'offset' market is actually frustrating environmentally superior outcomes by pointing investment in the wrong direction.

That's about the size of it. As with emissions trading, the focus on short-term 'efficiency' without fostering radical innovation and local sensitivity is leading, paradoxically, to ineffectiveness.[431]

Why wasn't this foreseen?

A lot of it was. Even a carbon trading proponent, Michael Grubb, admitted early on that the CDM had the potential to turn into a 'sink for the intellectual as well as some of the physical resources of the developing world, and a distraction from the fundamental goals of sustainable development'.[432]

But such warnings were not heeded. It was simply assumed that fixes could be concocted that would make carbon trading compatible with constructive climate action. Once again, free-market ideology – and the hope that the fundamental contradictions of the Kyoto Protocol would simply go away if they were ignored – have occupied the space that should have been taken up by a careful weighing of the evidence and an investigation of the existing institutions, infrastructure, and traditions of different countries and regions. Many officials and environmentalists – including many NGOs – have been looking for 'positive solutions' in the wrong place. In the words of Ruth Greenspan Bell, they have prescribed the cure before examining the patient.[433] A lot of time has been wasted.

Still, suppose I'm a renewable energy developer with a strong interest in working closely with small communities. Frankly, why should I care? This market, wacky as it is, is already here, and maybe I can get some money out of it for my

pet schemes, even if its overall tendency is destructive. After all, there aren't all that many opportunities to get funding for renewable energy around, and I've got to take them where I can find them.

If you still think this market is going to provide support for the painstaking work you do, good luck. As one Dutch banker involved in the carbon credit market put it recently, '[F]ew in the market can deal with communities.' Economic carbon projects are not going to be the ecologically- or socially-beneficial ones.

The problem is not just that only 2 per cent of CDM money is going into renewable energy. It is also, as Ben Pearson stresses, that the CDM is *diverting* finance that should be going into renewable energy into easier projects that merely prop up an outdated, fossil fuel-dependent industrial structure. As a renewable energy developer, you stand to lose from the CDM in the long term.

All right, let me adopt an even more cynical attitude. Suppose I'm not a responsible renewable energy developer but rather a Southern government. Surely the CDM will be useful to me and my ministries as a source of new investment in my country. The investment may not do any good for global warming, and it may be economically and socially useless.[434] *But it might, if I'm lucky, at least provide a few new capital flows to development projects – and my business sector.*

It's hard to argue this point. But notice that we've now left the climate debate behind entirely, by admitting that the CDM has nothing to do with tackling global warming. The fact that the conversation has collapsed into a general discussion of international investment and development shows to what extent the institutions concerned have taken over and diverted the climate debate. And that should give us pause.

Even if CDM projects are considered merely as 'foreign direct investment through construction' with no climatic benefits, they still hold the same sort of risks as any other foreign direct investment. As Yin Shao Loong and Ben Pearson point out, these include 'shift of capital ownership from domestic to foreign and high transfers of surplus away from host countries'.[435]

If carbon credit investors are mostly interested in high-volume industrial projects, or those with low transaction costs, doesn't that mean they're going to wind up discriminating against smaller, poorer Southern countries anyway, and favouring only a few, well-prepared ones?

Yes. The World Bank has admitted that most Southern countries can deliver only small projects. The risks and high per-credit transaction costs involved in delivering carbon from these projects makes it unlikely that smaller, poorer countries will be able to attract much carbon finance.

Indeed, the Bank's response to the problem – setting up a special-purpose Community Development Carbon Fund that pays higher than market prices for small projects in Southern countries – is an implicit admission that 'the market' will not work in the hoped-for way in the South, and that a carbon market that revolves around private capital and low-cost carbon credits will bypass the smallest countries.

As of August 2006, just four countries – China, Brazil, Korea and India – were hosting over 61 per cent of the 265 CDM projects registered by that date, and producing an overwhelming 86 per cent of the associated CDM credits (see Figures 9 and 10).

Figure 9. Expected Average Annual CDM Credits from already registered projects, August 2006

Source: UNFCCC

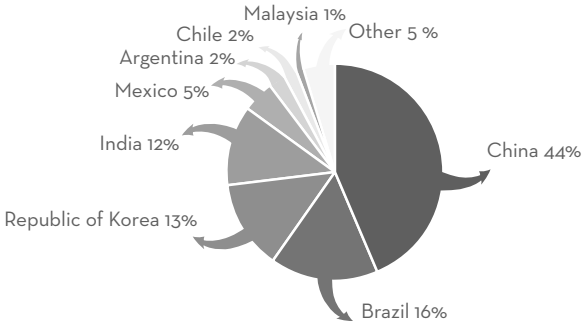
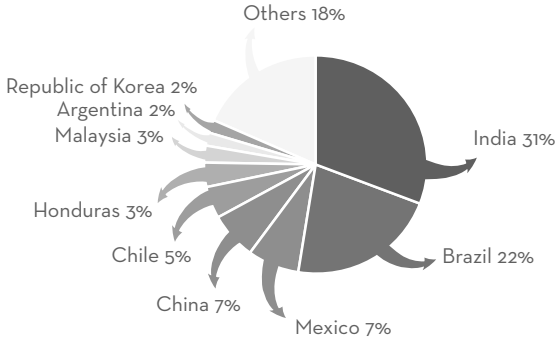


Figure 10. Number of Already-Registered CDM Projects by Country, August 2006

Source: UNFCCC



Where's the enforcement?

One of the most important lessons of US pollution markets is that trading requires not only a credible system of measuring emissions but also a system of strict enforcement of the rules under a single governmental jurisdiction.[436]

As argued above, these conditions are not present under either the Kyoto Protocol or the EU ETS. Measurement is inadequate or impossible. Monitoring is insufficient or impossible. Penalties would have to be made far more serious than they are today. And without a world government, signatories to treaties such as the Kyoto Protocol may simply renege on their agreements if they find that meeting their targets are inconvenient.

Both Los Angeles's RECLAIM and the US sulphur dioxide programme were instituted under single governmental jurisdictions that were able to impose tough and enforceable penalties.[437] The Kyoto Protocol, by contrast, is an international agreement that will be easy for any country to disobey, or withdraw from, if its pollution allowances prove insufficient. Former Canadian Finance Minister John Manley recently reassured Canadians that they should not worry about international penalties if the country falls short of its Kyoto targets, because the treaty is 'not binding'. Countries that do stay in the agreement but overshoot their targets in 2012 are required to find only an extra 0.3 permits over the next five years on top of each permit they 'owe'.

The EU ETS may appear to have more enforcement power at its disposal than Kyoto does. However, it's revealing that it dares to impose only a paltry penalty of €40 per tonne of carbon dioxide on those who use more than their entitlements, compared to an April 2006 carbon price that had reached €30 per tonne. This effectively caps the carbon price at a level not much higher than it started out at – a level everybody agrees is not going to provide an incentive for structural change. Even then, Germany proposed halving the penalty in 2006.[438] By contrast, the US sulphur dioxide programme imposed a penalty 20 times the permit price.

But will it really come to the point that countries simply default on their Kyoto targets?

Well, it's already clear that many industrialised countries won't achieve their targets – even if they take advantage of what economist Cornelius van Kooten calls the 'smoke and mirrors' of purchases of 'hot air' from Russia and the Ukraine, 'carbon offset credits for

business-as-usual forest management', 'temporary carbon sinks' and bogus emission 'reductions arising from a "fortunate" choice of base year.'[439] Carbon trading hasn't made the bullet of emissions reductions much easier to bite than it was to begin with.

Each Kyoto signatory knows, moreover, that both it and its fellow signatories have strong short-term economic incentives to look the other way when firms exceed their emissions targets. That makes default even more tempting.[440] Many observers have doubts whether Kyoto-like agreements can survive after 2012 anyway.

As pollution trading expert Ruth Greenspan Bell observes, it is 'highly unlikely that anything approximating the rigour of the US [sulphur dioxide] trading system can be devised to control climate change worldwide' in the future even if measurement of emissions were possible, since countries tend to see international oversight as a 'threat to their sovereignty'.[441] They are likely to withdraw from a treaty whose conditions are too onerous, or simply accept the penalties imposed by a lax agreement.

Not that the US itself is exactly a model for 'rigour' in this respect.

No. As economist William D. Nordhaus notes, 'the accounting scandals of the last decade have not been limited to dollar scandals,' but 'have also spilled over into emissions markets.'[442] Greenspan Bell herself has documented the case of PSEG Fossil LLC, the biggest player in New Jersey's emissions trading system, which apparently had not installed necessary pollution controls or obtained proper permits:

> The US Justice Department discovered this and brought an enforcement action, which was resolved in the form of a consent decree. PSEG, without admitting any wrongdoing, agreed to stop selling its credits to other firms and to stay out of the trading system. When PSEG was forced to withdraw, its sheer size and status as one of the largest "suppliers" of credits in New Jersey brought that state's system close to collapse.[443]

It makes you wonder what kind of fraud lies ahead for the world carbon market.

Yes. 'Such cheating,' Nordhaus concludes, 'will probably be pandemic in an emissions trading system that involves large sums of money.' He observes that whereas in a tax system, the government has an incentive to try to ensure taxes are paid, in an emissions trading system, both buyers and sellers can afford to be indifferent to whether reductions have actually been made. Tax evasion in the US is on the order of 10 or 20 percent of taxes due. Given the incentives and the lack of adequate means of quantification, it is hard to put an upper limit on the extent

of cheating possible in a global emissions trading system. As Greenspan Bell remarks, 'keeping companies honest is hard enough in a robust legal and regulatory environment, as Enron's sham energy trades and WorldCom's balance-sheet fraud amply demonstrated. In a weak legal system, the potential for emissions trading fraud is enormous.'[444]

The lack of an adequate measurement system for either carbon emissions or so-called 'emissions reductions' only adds to that potential, making cheating not only easy but almost irresistible.

What about the legal systems of various countries? How will they respond when US-style pollution trading systems are pushed on them?

Greenspan Bell emphasises that many Southern countries will be unable to 'manage or enforce complex intangible property rights concerning goods such as polluted air escaping from a factory' or provide enough incentives for businesses to run pollution control equipment even if it is installed. International standards governing CDM projects

Carbon Trading's Unconscious Cultural Assumptions

The theory behind carbon trading is that factories, power plants, and anyone else that generates carbon dioxide will be eager and capable partners in deals to buy and sell emissions. Nothing seems more obvious to many middle-class Westerners.

But the theory rests on several faulty assumptions. The first is that all industry everywhere wants to save on the costs of obeying environmental laws. But where pollution laws are little more than paper, industry knows it need not worry much about these costs. Plants that aren't being forced to comply with requirements may not see the point in elaborate trading regimes.

A second assumption is equally intuitive for many Westerners, but equally wrong: that the opportunity to trade will reveal a natural instinct to make a profit and to do so in the most efficient way possible. In much of the world, efficiency and profit are secondary to production or employment goals, or the need to maintain valuable traditions, and supposedly 'uncompetitive' companies are kept afloat through government support.

A third weak assumption behind carbon trading is that even if plants around the world are not themselves motivated to embrace clean technologies, they will accept them if they are offered free through the Kyoto Protocol's flexible mechanisms. Maybe so, but what incentives do they have to keep the equipment on and pay its running costs? That doesn't happen anywhere without disinterested enforcement.

In short, carbon trading rests on unexamined cultural assumptions many of which are unrealistic in most of the world.

Source: Ruth Greenspan Bell, 'The Kyoto Placebo', *Issues in Science and Technology*, Winter 2006.

are even less likely to be obeyed (see Chapter 4) – particularly since carbon accountants' inability to verify that such projects 'compensate' for any given quantity of industrial carbon dioxide emissions is not a problem that can be fixed by improvements in technique.

'Survey the world', Greenspan Bell says, 'and few countries can demonstrate dependable legal systems and an independent judiciary ready to stand behind contracts such as environmental trading agreements'.[445] Pursuing violators is going to be hard when one party to a transaction is a state-owned enterprise that is 'clearly more powerful than the regulatory body that supposedly supervises it, or when the ultimate beneficiary of the sale of emission credits is the party in power. When the scale of the regulatory effort is global, no world court exists to litigate the trustworthiness of the pollution reductions that become emission credits.'[446]

Many countries also have legal traditions and conceptions of the relationship between government and industry which are a far cry from those of the US.

Narrowing the discussion

All right, I admit carbon trading may not have much potential for helping us to address climate change directly. But it's valuable at least in that it encourages the public in Northern countries to discuss and educate itself about the global warming issue.

How does it do that?

Well, look at business. When carbon has a price, business has to pay attention. For the first time, the climate crisis speaks to corporations in a language they can understand. As a result, the business world begins buzzing with concern and ideas for action. And that's bound to have a positive long-term effect on climate. If only it were possible to calculate that into the monetary value of carbon credits!

Let's look at these claims carefully. First, do carbon prices direct business's attention and ingenuity toward the climate crisis – or away from it? As documented above, the European market for carbon so far hasn't pushed corporations into creative long-term undertakings to do something about global warming. Instead, it has taught them how to lobby for more emissions permits, find ways of passing on costs to customers, game the system, locate cheap carbon credits abroad, present a green

face to the public, keep gas as an option, and make marginal efficiency improvements. Responding to carbon prices is one thing; taking practical long-term action on climate change quite another.

The truth is that carbon prices are a pretty inferior way of educating corporations about climate change and its importance for their work. Insurance companies are already learning fast through other means – including Hurricane Katrina's devastation of New Orleans – that global warming threatens their business. Power utilities, technology developers and retailers are already asking governments for longer-term signals than those that are provided by a market. There are more credible ways of entering into a dialogue about climate with corporations than by appealing to a new commodity system whose flimsy basis they are only too well aware of. As University of London geographer John Adams notes in a similar context, '[T]reasuries and big business are better equipped than most to notice when someone is speaking nonsense in their own language.'[447]

Maybe so, but how about the case of individual consumers?

You mean people buying carbon credits in the 'voluntary market' to make up for the carbon dioxide emitted during their jet flights or international conferences?

Yes. Admittedly, these carbon credits – the ones you buy from firms like the Carbon Neutral Company, Climate Care, Atmosfair, Natsource, Terrapass, DrivingGreen, Drive Neutral, carbonfund.org, MyClimate, AtmosClear Climate Club, Carbonfund.org or Climate Friendly – don't really make your jet flight or home or daily driving verifiably 'carbon-neutral' or 'zero carbon'. But when you buy these 'offsets,' at least you have to calculate how much carbon you emit in your daily life. That can't help but improve your awareness of the causes of climate change.

Take a simple example. An executive trainer from Reading, UK named Charlotte Robson recently learned for the first time from the Carbon Neutral Company's carbon calculator that her personal carbon 'footprint' was 24 tonnes of carbon dioxide per year. 'I am astonished I have been such a monster,' Robson wrote in the London Daily Telegraph.[448] *Isn't it great that people like her are discovering the real impacts of their actions?*

It's not clear what is really being discovered here. Is the cause of climate change really that individuals like Charlotte Robson are 'monsters'? Is Charlotte Robson personally responsible for the historical lock-in of heavy fossil fuel use in industrialised societies? Does she choose for the UK government to use her tax money to subsidise oil extraction and road and airport construction rather than renewable energy? Did she

have a say in the invasions of Iraq in 1991 and 2003? Somehow it's hard to imagine Charlotte Robson being as bad a person as she says.

The deeper difficulty is that if you blame yourself as an individual for climate change, then you're likely to think that, by the same token, you can also discharge all your responsibility for solving the problem simply by making a few different personal lifestyle choices. If you blame 'consumers' for global warming, then you'll probably think that the solution lies in reforming their individual consciousnesses and purchasing habits.

Now that you mention it, Charlotte Robson did report being pleasantly surprised to learn from the Carbon Neutral Company that all she had to do to 'neutralise' the effect of her carbon-emitting ways was to make out a cheque to the firm for around GBP 156 a year for planting trees and building non-CO_2 emitting energy-generation plants. 'A cost of GBP 156 is nothing,' she exulted. 'Think of the money you spend on lipstick and magazines.'

Exactly. Thanks to the Carbon Neutral Company, Robson was able to feel that she had gone from 'monster' to makeover in a heartbeat.[449] The question is to what extent this sort of cathartic individual drama helps move society toward understanding the urgency of change in the policies that feed global warming. Does it help anyone understand that most remaining fossil fuels are going to have to be left in the ground? Or that choosing a better brand of consumer product may have limitations as a strategy for dealing with climate change? It would seem that it does just the opposite.

Well, but surely customers of the Carbon Neutral Company and similar firms, once they're sensitised to the issue, will go on to try to reduce their use of fossil fuels as well as try to 'offset' them. As companies selling 'voluntary' carbon credits to the public often point out, they're bound to begin thinking more about how they might save carbon in their daily lives.

For example, after calculating her individual carbon emissions, Charlotte Robson decided to try to minimise business travel: 'If a client wants two programmes in Singapore, they have to be at the same time, so we don't stack up CO_2 by flying in twice'. Surely there's nothing wrong with that!

The problem is that the misleading term 'carbon neutral' conveys a completely different message: that any emissions that people happen to be personally unable or unwilling to reduce can be compensated for by buying carbon credits instead, since buying credits is climatically 'just the same' as reducing fossil fuel use.

You can use carbon credits, the Carbon Neutral company says, for those areas in which your emissions are 'unavoidable'.[450] But what

are those areas? What are the criteria for being 'unavoidable'? Who decides what is 'unavoidable'? What it is about the way society is organised that makes these emissions 'unavoidable'? How might they ultimately be made 'avoidable' through political action and planning? The answers to all these questions are left mysterious. Indeed, the questions themselves go unasked.

What's left is a feeling of personal guilt and resignation, not a sense of history, politics or economics. In addition to propagating the falsehood that carbon credits can 'neutralise' emissions, such corporations convey a message that nothing can be done about what they call 'unavoidable' emissions. That's disempowering, to say the least.

But maybe the awareness that comes with buying carbon credits from firms like the Carbon Neutral Company will someday lead customers to other, more engaged kinds of thinking and action on global warming.

Maybe, but it's difficult to see how. The main message such firms provide today is that individual consumers can relieve their guilt through purchases. It's a classic instance of helping to shape demand for a new product while simultaneously offering to supply that demand.

This commercial recasting of climate politics as a narrative of individual guilt and redemption tends to poison public discussion, not promote it. It makes criticism of, say, air travel or car-centred societies seem like a moral critique of the 'rich and privileged' for being 'self-indulgent' and a call for government to 'punish' them. That only provokes defensive reactions against calls for long-term social action.[451]

In reality, the climate crisis doesn't require people to feel guilty. What it requires is for them to be aware of the deeper roots of the problem, and to join with others in political action. It requires not buying and selling 'offset' credits, but social responsibility.

All right, but what about the public discussion encouraged by official emissions trading programmes? Emissions trading helps the public decide how much they want to invest in action on climate change, by enabling it to focus on how strict the emissions 'cap' should be, rather than arcane questions about what technologies industry should be required to adopt to meet that goal, which are best left to industry itself. Emissions trading opens up an intelligent, democratic debate about questions about overall goals, such as 'How important is a healthy environment anyway? When should we stop pouring money into the environment in order to make room for more spending on education, health or foreign aid?'

That's not what happened in the US. When promulgating the sulphur dioxide trading programme, as Georgetown University law profes-

sor Lisa Heinzerling points out, the US Congress didn't debate how much emissions should be cut or how badly sulphur dioxide was affecting forests, streams and lakes. Instead, Congress merely accepted the emissions cut originally proposed to it and occupied itself with dividing up the rights to pollute that it was giving away in a way that would best satisfy influential business interests. Along the way it handed out special favours to, among others, the high-sulphur coal industry, a powerful lobby group, by providing extra incentives to use scrubbers – thus contradicting the claim of trading enthusiasts that the scheme would give polluters the freedom to choose means of controlling their pollution. As Robert Glicksman and Christopher H. Schroeder note, legislators seemed to see 'little distinction between the Clean Air Act and a fight over which defence installation to close, or an appropriation for public works project. The pork tastes as good, from whichever barrel it comes.'[452] Alternatives to giving rights away free to high-polluting corporations were also little discussed, though if they had been, the controversy could have been intense.

As noted above, discussion of social goals has also taken a back seat to horse-trading during the implementation of the EU Emissions Trading System. And the market in CDM and JI credits is likewise unfriendly to democratic discussion of social goals, including emissions cuts.

Unfriendly in what ways?

Well, for one thing, anyone wanting to comment on planning documents for CDM projects (for example) has to learn English, find a computer, log onto a website, register, and then navigate hundreds of pages of technical jargon, usually under a tight deadline. CDM comment forms provide no spaces for discussing the reliability of the implementing companies or the indeterminacy and scientific ignorance that stand in the way of the projects' being verifiably climatically effective. Nor are there spaces for questioning the ubiquitous assumption that such projects produce 'emissions reductions'.[453] As one Indian social activist remarked on being confronted with an official UN form for submitting comments on a CDM project, 'the form for public input is so full of technicalities there seems to be no space for general comments'.[454]

By their sheer bulk and repetitiveness, such documents entrench a 'mainstream' discussion about climate change that sidelines thinking about how to halt the flow of fossil fuels out of the ground and limits the political choices a society can make to small, incremental variations on business as usual. As Adil Najam and colleagues concluded in 2003, 'There is a danger that Kyoto has now become so much of a mechanism for managing global carbon trade that emission cuts for

atmospheric carbon stabilisation could be neglected, or at least delayed.'[455]

But surely the Kyoto Protocol has focussed public attention on overall emissions targets. That's what Kyoto means for most people – a set of targets – even if everybody agrees they're inadequate.

That's true. But Kyoto's success in making emissions reduction targets a matter for political debate isn't due to the market that the treaty sets up. Emissions targets were going to be a public issue whether or not carbon trading was involved.

I'm still a bit confused by this discussion. Politicians and economics professors are always telling us that markets reduce centralised decision-making and bureaucracy, and allow people to think and act for themselves. Are you saying that isn't always true?

The charitable response would be that politicians' press conferences and economics classrooms are perhaps not the best places to learn about these issues.

After 60 years, Karl Polanyi's perspective is still the more balanced one: that trading schemes are 'opened and kept open by an enormous increase in continuous, centrally-organised and controlled interventionism'. The Kyoto Protocol's market has set up one of the most centralised, opaque, complicated and jargon-ridden international processes ever seen, while the EU ETS is perhaps the most complex, impenetrable piece of environmental legislation Europe has ever known.

True, the Kyoto market does not dictate to anybody the technologies they must adopt to reduce emissions. And it has opened up all sorts of discussions about the means by which countries might meet their minimal emissions reductions obligations. But at the same time, it has created large bureaucracies remote from ordinary people at both global and national levels in order to try to create a market commodity – to inventory emissions; divide up emissions rights; register trades; protect property rights; approve, validate and verify projects; establish exchanges; enforce compliance; ensure reporting and so on.

Not even the US's sulphur dioxide scheme actually decentralises decision-making to firms. Since power generation is highly regulated, it merely pushes certain decisions back onto state public utility commissions. At no point was the price of pollution rights ever determined by anything describable as a 'market' separable from 'government'.

Are you saying that the carbon market isn't, after all, increasing transparency and giving ordinary people more choices?

Well, look around you. Few members of the general public have any inkling of what is going on in the bureaucracies that govern either the UN's or the EU's climate market, or what evasions, abuses and conflicts are afoot. Few are even aware how far the attempt to set up a giant global carbon market has gone. Few, too, can make sense of the swarm of acronyms and technical terms Kyoto has spawned and continues to spawn, including AAUs, CERs, ERUs, DNAs, DOEs, NAPs, PDDs, AIEs, SBIs, COPs, MOPs, SBSTAs, LULUCF, additionality, model rules, meth panels, supplementarity, leakage, and so on. Not even many journalists covering climate know what's going on.

No wonder I haven't heard about all this stuff before.

Yes. That's not to say that there hasn't been a lot of debate about the shortcomings of pollution trading. But it rages largely among affected communities and an expert elite with its own interests. The public at large, whether in the US or worldwide, has tended to be fooled by the complexity of trading systems into believing that they are reducing pollution more than they are. On the whole, public debate has not been enhanced, but rather blocked, by the schemes. And, as will be detailed in the coming chapter, the carbon market has not expanded, but rather contracted, ordinary people's choices, in case after case.

Nor is the discussion helped when NGO trading proponents insist that emissions markets have nothing to do with assets and property. 'The Kyoto Protocol and the EU ETS do NOT create property rights,' one large Washington environmental NGO staff member proclaimed indignantly in late 2005. 'The EU ETS created the "allowance" specifically to make clear that is constitutes a discrete permit under a regulation, not a property right.'[456] Kyoto units are merely 'unitised and divisible embodiments of promises,' insists another environmentalist.[457] To warn the public that assets are being given away to the rich, fumes still another, is 'ideological claptrap'.

Such dismissive views block intelligent public debate about what kind of property rights emissions trading schemes involve; whether those rights are defensible; how they might be distributed or transferred and to whom and for whose benefit; and so on. Such a debate is crucial. Whose atmosphere is it, and whose earth? This is a question for everybody, not just for government ministries, lobbyists, experts and large environmental NGOs.

Indeed, one of the reasons the EU ETS has run into such difficulties is that there has been no open debate on allocation of allowances. No newspaper or television programme appears to have covered the 'choices involved in setting up the system during the period in which

it would have been possible for the plans to have been changed.'[458] Even the brief debate on the system in the European Parliament on 10 October 2002 was unreported in any major British broadsheet or financial newspaper. Nor did many Members of the European Parliament understand the ramifications of the scheme, since the official summary they had been given did not discuss who owned the rights that the permits represented, but only which industrial sectors would be covered, how many allowances should be given out free, and so forth. The last thing that is needed is more such suppression of debate.[459]

But are conventional regulation or taxes any more transparent to public scrutiny or conducive to public discussion?

In many ways, they are. As law professor and emissions trading expert David Driesen remarks,

> With a little work, citizens can understand whether an Environmental Protection Agency or state regulation will force a factory in their neighbourhood to meet emission limitations, including technology-based limitations, that similar factories meet elsewhere, or that can be met with known technology. Understanding the myriad potential games that can be accomplished through emissions trading requires expertise that very few possess.

The fact that emissions trading, unlike more conventional forms of regulation, allows each factory to 'emit at a different level from its peers', makes public scrutiny and comparison even harder. Keeping track of trades in the 'invisible, intangible commodity' that consists of 'the right to emit a given amount of CO_2' is going to be difficult for ordinary people even in a country like the US. Imagine the problems for nations with different understandings of property rights and property law, whether in Europe or the South.[460]

Maybe what you say is true. But isn't too much public discussion sometimes dangerous, too? For example, by exposing problems with carbon trading, you're exposing problems with the Kyoto Protocol. And isn't that, again, just playing into the hands of George W. Bush and other obstructionists?

No. It's precisely to insist on the respect for evidence that Bush lacks, by seeking answers to global warming that work while trying to avoid those that don't. The 'trading fix' for global warming currently promoted by many governments and mainstream NGOs, in fact, is similar in many ways to the 'technological fix' that Bush is seeking. Both fixes fail because they pretend to be able to avoid the unavoidable: politics.

Summing up – Market ideology vs. climate action

Many people of strong environmentalist convictions and democratic spirit genuinely believe that if the earth's carbon-cycling capacity is to be respected and preserved, it is inevitable that it be treated as a commodity. 'Given the logic of capitalism', says Peter Barnes, one thoughtful US environmentalist and egalitarian, treating carbon-cycling capacity as a 'scarce resource' and an 'asset' to be marketed 'is the best way to save it'.

Not, Barnes hastens to add, that the 'sky has no value other than its exchange value… . If anything we know can be called sacred, the sky is such a thing… . It has incalculable intrinsic value.' Yet, at the same time, he argues:

> [W]e need to communicate with markets because markets determine how resources are used. All our preachings and sermons will be for naught if we don't inscribe them on tablets that markets can understand… [The market] is a great system for managing scarcity… If you ask a market to determine price of a thing someone owns, it will do so quickly and efficiently. Transactions will then follow… [The price] is not the equivalent of the intrinsic value, nor an editorial comment on it. It's merely a proxy, a useful numerical substitute. And it's a much better proxy than the one markets currently use – namely, zero… . To achieve the ends of Chief Seattle, we must use the means of Dow Chemical. The world has come to that, and it's sad. But… selling the sky is not an end in itself. It's a means for achieving a higher end – the preservation of our planet.[461]

This chapter has provided concrete materials to help show that this appealing argument – which today is encountered in politics, in international development, in the UN, in think tanks, in the academy and in environmentalist circles – is both invalid and unsound. That is, it has helped show both that its conclusion does not follow from its premises, and that the premises themselves are mistaken.

The argument is *invalid* because even if the premise that the 'logic of capitalism' necessitates or encourages pollution markets were true, it would not follow that carbon trading is a sensible regime for addressing global warming. By the same token, while it is true that some 'markets' do partly determine how some resources are used in some circumstances, and that having a 'zero price' does result in the

inadequate valuation of some resources in certain limited contexts, it doesn't follow that a trading system of the type currently being set up is capable of improving the 'scarcity management' of the earth's carbon dump in a way that could foster a liveable climate.

Price is *not* a 'useful numerical substitute', in any context, either for the 'intrinsic value' of carbon-cycling capacity (whatever that might be) or its survival value. To suggest that it could be reveals fundamental misunderstandings of climate, scientific as well as social, economic and political. The purported carbon commodity is different from established commodities such as wheat or silver. For governments to take it upon themselves to make it an economically scarce good is not encouraging, but rather hampering, practices that could increase the chances of a liveable climate in the future. The price assigned by carbon markets in the course of 'managing' that scarcity, accordingly, and the resulting incentives and 'transactions', are moving the world away from that goal rather than toward it. This is particularly so in view of the facts that the market 'management' of this scarcity involves providing extensive property rights to corporations, is biased mainly toward short-term cost reductions for industry, and involves a commodity that is an incoherent amalgam consisting both of 'emissions' and of credits generated by carbon projects.

The argument is also *unsound* in that its premises are false. In truth, 'markets' do not, in most circumstances around the world, 'determine how resources are used,' in any sense in which markets can be distinguished from, or do not depend on, commons regimes, state agencies and other social organisations that don't revolve around the price mechanism. To put this another way, it is empirically false that no market price entails less responsible stewardship than a positive price. Only if, *per impossibile*, commodification somehow became all-pervasive, and the price mechanism the sole and all-powerful coordinating mechanism for all transactions involving land, water, life and so forth, could this assertion even become possible to evaluate. Carbon trading, in addition, is no more congenial to anything that might be called the 'logic of capitalism' than a multitude of other types of regulation, taxation, planning and stewardship that private corporations themselves have always depended on – and in this case, given the increasingly obvious contradictions of carbon trading, may wind up preferring.

As in so many areas of contemporary social life, a vague ideology of market effectiveness and market inevitability is concealing a regressive, confused, contested and environmentally dangerous political and technical project. The ideology and the project both badly need to be opened to wider public criticism.

1 Ruth Greenspan Bell, 'Market Failure', *Environmental Forum*, March/April 2006, pp. 28–33, http://www.weathervane.rff.org/, p. 28.

2 Whether trading is an efficient way of reaching a goal depends on what the goal is, and how society and technology are organised in any particular time or place. Trading in land would not have been an efficient way of maximising returns to scale from grazing during the era of open-field agriculture in Europe (Carl Dahlman, *The Open Field System and Beyond: A Property Rights Analysis of an Economic Institution*, Cambridge University Press, Cambridge, 1980, pp. 115–21). Trading in agricultural seed varieties is not the most efficient way of making the greatest diversity available to the most people over the long term. Trading in bandwidth is not an efficient way of ensuring the free exchange of information over radio. Trading in human rights would not be an efficient way of maximising respect for human rights, nor trading in medical malpractice an efficient way of ensuring the best health care. Privatised electricity, water and medicine typically result in higher prices for small consumers. Raising the price of energy can be a less efficient way of reducing energy use than regulating certain kinds of investment (Gar Lipow, *No Hair Shirts: Money and Politics in the Fight against Global Warming*, draft manuscript).

3 Larry Lohmann, 'Pulp, Paper and Power: How an Industry Reshapes Its Social Environment', 1995, http://www.thecornerhouse.org.uk/item.shtml?x=52196.

4 Nicholas Stern, 'What is the Economics of Climate Change?', Stern Review on the Economics of Climate Change, 31 January 2006, London. See also Anne Hambleton, 'An Annotated Glossary of Commonly-Used Climate Change Terms', The Centre for Sustainable Development in the Americas, http://www.csdanet.org/glossary.html; Nathan E. Hultman and Daniel M. Kammen, 'Equitable Revenue Distribution under an International Emissions Trading Regime', Political Economy Research Institute, University of Massachusetts at Amherst, Centre for Science and the Environment, International Conference on Natural Assets, Tagtaytay City, the Philippines, 3 January 2003.

5 Gerald Torres, 'Who Owns the Sky?', *Pace Environmental Law Review* 19, 2001, pp. 515-574.

6 Richard L. Sandor *et al.*, 'An Overview of a Free-Market Approach to Climate Change and Conservation', in I. R. Swingland, ed., *Capturing Carbon and Conserving Biodiversity: The Market Approach*, Earthscan, London, 2002, p. 56.

7 *Carbon Market Europe*, 24 June 2005, http://www.pointcarbon.com.

8 UNFCCC, 'Principles, nature and scope of the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol', Decision 15/CP.7, http://unfccc.int/documentation/decisions.

9 US Environmental Protection Agency, Clean Air Act Amendments, 1990, Section 403 (f), Title IV, http://www.epa.gov/air/caa/title4.html.

10 'S. 139, the Climate Stewardship Act', Sec. 331, http://democrats.senate.gov/~dpc/pubs/108-1-379.html.

11 Carol M. Rose, 'The Several Futures of Property: Of Cyberspace and Folk tales, Emission Trades and Ecosystems', *Minnesota Law Review* 83, 1998, p. 129.

12 Jeanne M. Dennis, 'Smoke for Sale: Paradoxes and Problems of the Emissions Trading Program of the Clean Air Amendments of 1990', *UCLA Law Review* 40, 1993, pp. 1101–1125.

13 *Ibid.*, p. 1118.

14 The Kyoto Protocol differs sharply from most systems of tradable fishing or hunting quotas, in which the total number of quotas given out is supposed to represent only a small part of the available stock, or a 'sustainable yield'. Under Kyoto, the total number of emissions quotas given out is several times the 'available' stock or resource. Of course, the number of these permits is supposed to be reduced over time.

15 Karl Polanyi, *The Great Transformation*, Beacon Press, Boston, 2002 [1944].

16 Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge University Press, Cambridge, 1990.

17 C. B. Macpherson, ed., *Property: Mainstream and Critical Positions*, University of Toronto Press, Toronto, 1978.

18 *Ibid.*

19 As Daniel H. Cole remarks in *Pollution and Property: Comparing Ownership Institutions for Environmental Protection*, Cambridge University Press, Cambridge, 2002, a utility can't stop the government from confiscating the allowances it is given, but 'it certainly can exclude all others from interfering with it' (p. 54).

20 Quoted in J. P. Morgan, client report, Global Utilities Partner, London, 10 November 2003, p. 38. The Board says that participating companies should 'account for allocations of emission allowances or rights to emit as intangible assets' whose 'fair value' should be 'determined by the appropriate market prices at the time of allocation'.

21 W. Fichtner *et al.*, 'The impact of private investors' transaction costs on the cost effectiveness of project-based Kyoto mechanisms', *Climate Policy* 3, 3, pp. 249–59, p. 257.

22 Friends of the Commons, *The State of the Commons 2003–04*, http://www.friendsofthecommons.org.

23 Timothy Mitchell, *Rule of Experts: Egypt, Technopolitics, Modernity*, University of California Press, Berkeley, 2000, pp. 59–74.

24 *Ibid.*, p. 73.

25 *Ibid.*

26 *Ibid.*, pp. 84–93.

27 *Ibid.*, p. 71.

28 Rebecca Leonard and Kingkorn Narintarakul na Ayutthaya, 'Taking Land from the Poor, Giving Land to the Rich', *Watershed* [Bangkok], Nov. 2002 – Feb. 2003, pp. 14–25.

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30 Michael Dove, 'Centre, Periphery and Biodiversity: A Paradox of Governance and a Developmental Challenge', in Stephen B. Brush and Doreen Stabinsky, *Valuing Local Knowledge: Indigenous People and Intellectual Property Rights*, Island Press, Washington, DC, 1996, pp. 41–67.

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171 *Ibid.*, pp. 83–4.

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178 Lipow, *op. cit. supra* note 2.

179 In its first years, FedEx lost money building the infrastructure necessary to implement reliable overnight mail delivery. Once it had put the necessary infrastructure in pace, however, it began to profit by offering the service. Venture capitalists financed Jeff Bezos's 'inefficient' Amazon.com for years in the hope that the company would eventually turn a profit, even though it lost hundreds of millions of dollars to start with. By contrast, venture capital for environmental technologies in the US has dropped in recent years at a time when emissions trading has gained unprecedented prominence. See Driesen, *op. cit. supra* note 161, pp. 93–97.

180 Israel M. Kirzner, *Discovery and the Capitalist Process*, University of Chicago Press, Chicago, 1985, p. 157.

181 Tim Denne, 'Aggregate versus Gas by Gas Models of Greenhouse Gas Emissions Trading', Centre for Clean Air Policy Scoping Paper No. 6, 1999, p. 19.

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185 Henrik Hasselknippe and Kjetil Reine, *op. cit. supra* note 150.

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191 Moore, *op. cit. supra* note 61, p. 23.

192 For example, the Competitive Enterprise Institute states that the costs of complying with the Kyoto Protocol alone would cost the US USD 300 billion per year, losing 28 per cent of GDP over 10 years (cited in Vijay V. Vaitheeswaran, *Power to the People*, Earthscan, London, 2005). Energy expert Amory Lovins claims, by contrast, that reductions in carbon emissions would *save* USD 300 billion annually given better capital allocation and correction of organisational and regulatory failures, lack of information, perverse incentives, and so on ('Climate Protection for Fun and Profit', note 168). The US Department of Energy also predicts billions of dollars in savings ('Scenarios for a Clean Energy Future', *supra* note 148). Differences in assumptions even among conventional economic models can 'easily lead to cost estimates that differ by a factor of ten or more', notes Stanford economist John Weyant. 'If you ask the broader question of how much tackling climate change will cost over this century', concludes Vaitheeswaran, 'the honest answer must be that we simply do not know'.

193 Jack Cogen, presentation at the side event arranged by the International Emissions Trading Association and the World Bank at the Conference of the Parties to the UNFCCC, Montreal, 5 December 2005.

194 Lipow, *op. cit supra* note 2.

195 Driesen, *op. cit. supra* note 161, p. 24.

196 Michael E. Porter and Claas Van der Linde, 'Toward a New Conception of the Environment-Competitiveness Relationship', *Journal of Economic Perspectives* 9, 1995, p. 97.

197 Driesen, *op. cit. supra* note 161, p. 86.

198 *Ibid.*, p. 68.

199 Commission on Sustainable Development, *Report of the Secretary General*, UN Doc.E/CN.17/2001/PC/20, 2000, p. 4; Driesen, *op. cit. supra* note 156.

200 Wolfgang Sachs *et al., The Jo'Burg Memo*, Heinrich Böll Foundation, Berlin, 2002, p. 38.

201 See, for example, Barbara White, 'Coase and the Courts: Economics for the Common Man', *Iowa Law Review* 72, 1987, pp. 577–635; Larry Lohmann, 'Making and Marketing Carbon Dumps: Commodification, Calculation and Counterfactuals in Climate Change Mitigation', *Science as Culture* 14, 3, pp. 1–33; Nick Johnstone, 'Efficient and Effective Use of Tradable Permits in Combination with Other Policy Instruments', OECD, Paris, 2003, http://www.oecd.org/dataoecd/11/55/2957650.pdf.

202 Pat Mooney, *What Next? Trendlines and Alternatives for Civil Society over the Next 30 Years*, Dag Hammarskjöld Foundation, 2006, http://www.dhf.uu.se; Ken Nealson and J. Craig Venter, 'Summary' of Workshop on The Role of Biotechnology in Mitigating Greenhouse Gas Concentrations, 23 June 2001, US Department of Energy, Office of Biological and Environmental Research; Alun Anderson, 'Craig Venter', *Prospect*, April 2006.

203 Greenspan Bell, *op. cit. supra* note 1, p. 21.

204 Michael McCarthy and Michael Harrison, 'Carbon trading will not cut airline emissions, says BA', *Independent*, 30 June 2006.

205 'BP's Credibility Gap over Carbon Emissions', *ENDS Report* 326, March 2002, p. 4.

206 Paul McGarr, 'Capitalism and Climate Change', *International Socialism* 107, 2005, http://www.isj.org.uk/index.php4?id=119&issue=107.

207 These figures are taken from the US's Carbon Dioxide Information Centre.

208 Personal communication.

209 Polanyi, *op. cit. supra* note 15.

210 'Robbed of the protective covering of cultural institutions, human beings would perish from the effects of social exposure; they would die as the victims of acute social dislocation ... Nature would be reduced to its elements, neighbourhoods and landscapes defiled, rivers polluted, ... the power to produce food and raw materials destroyed.... A self-adjusting market ... could not exist for any length of time without annihilating the human and natural substance of society; it would have physically destroyed man and transformed his surroundings into a wilderness' (Polanyi, *op. cit*., p. 3).

211 The grandfather of emissions trading, Ronald Coase, himself pointed this out: 'The rights of a landowner are not unlimited. It is not even always possible for him to remove the land to another place, for instance, by quarrying it. And although it may be possible for him to exclude some people from using 'his' land, this may not be true of others. For example, some people may have the right to cross the land. Furthermore, it may or may not be possible to erect certain types of building or to grow certain crops or to use particular drainage systems on the land. This does not come about simply because of governmental regulation. It would be equally true under the common law. In fact, it would be true under any system of law. A system in which the rights of individuals were unlimited would be one in which there were no rights to acquire' (Coase, *The Firm, the Market and the Law*, University of Chicago Press, Chicago, 1988, p. 155).

212 Daniel Altman, 'Just How Far Can Trading of Emissions Be Extended?', *New York Times*, 31 May 2002.

213 Torres, *op. cit. supra* note 5, p. 227. In addition, under conventional regulation, richer communities pay a smaller proportion of their wealth for overall pollution cuts than poorer ones do.

214 Altman, *op. cit. supra* note 212.

215 Moore, *op. cit. supra* note 61.

216 Haywood Turrentine, Chair, National Environmental Justice Advisory Committee, Letter to Carol Browner, Administrator, U.S. Environmental Protection Agency, 11 March 1998.

217 David Biello, 'Emissions Trading under Attack', *Environmental Finance*, May 2002.

218 *Ibid*.

219 Larry Lohmann, 'Whose Voice is Speaking? How Cost-Benefit Analysis Synthesizes New "Publics"', Corner House Briefing Paper No. 7, 1998, http://www.thecornerhouse.org.uk.

220 Altman, *op. cit. supra* note 212. Lifting regulation of utilities' profit margins makes the transfer of wealth to corporations in the form of emissions allowances still more blatant.

221 Simone Bastianoni *et al*., 'The Problem of Assigning Responsibility for Greenhouse Gas Emissions', *Ecological Economics* 49, 3, 2004, pp. 253–57, p. 254.

222 See, e.g., Michael J. G. Den Elzen *et al*., 'Differentiating Future Commitments on the Basis of Countries' Relative Historical Responsibility for Climate Change: Uncertainties in the "Brazilian Proposal" in the Context of a Policy Implementation', *Climatic Change* 71, pp. 277–301, 2005.

223 Larry Lohmann, 'Democracy or Carbocracy? Intellectual Corruption and the Future of the Climate Debate', Corner House Briefing Paper No. 24, 2001, http://www.thecornerhouse.org.uk/.

224 Keeler, *op. cit. supra* note 136.

225 FEASTA and New Economics Foundation, *op. cit. supra* note 97, p. 3; John FitzGerald, 'An Expensive Way to Combat Global Warming: Reform Needed in the EU Emissions Trading Regime', *ESRI Quarterly Economic Commentary*, April 2004; UBS Investment Research, 'European Emissions Trading Scheme', London, 2004, www.unepfi.org/fileadmin/documents/materiality1/emissions_trading_eu_ubs_2004.pdf.

226 Peterson, op. cit. supra note 116; Lisa Jacobson and Allison Schumacher, 'Emissions Trading: Issues and Options for Domestic and International Markets', Business Council for Sustainable Energy, Washington, 2000.

227 *Point Carbon*, 16 November 2004.

228 IPA Energy, *op. cit. supra* note 82.

229 *Point Carbon*, 16 November 2004.

230 *ENDS Report* 369, October 2005, p. 47.

231 *Ibid*.

232 'HSBC: Testing the Waters for Carbon Neutrality', *ENDS Report* 369, October 2005, p. 25.

233 *National Business Review* (New Zealand), 30 December 2003.

234 *Ibid*.

235 Thongchai Winichakul, *Siam Mapped: The History of the Geo-Body of a Nation*, University of Hawaii Press, Honolulu, 1994.

236 Michael Grubb *et al*., *The Kyoto Protocol: A Guide and Assessment*, Royal Institute for International Affairs, London, 1999, p. 98.

237 Bastianoni *et al.*, *op. cit. supra* note 221, p. 254.

238 Oilwatch, 'Position Paper: Fossil Fuels and Climate Change', The Hague, November 2000.

239 Peter Singer, *One World: The Ethics of Globalization*, Yale University Press, New Haven, 2002.

240 *Ibid.*

241 Torres, *op. cit. supra* note 5, p. 578.

242 Fred Pearce, 'Calling the Tune, *New Scientist*, 7 July 2001, pp. 47–9; Anil Agarwal *et al.*, *Green Politics: Global Environmental Negotiations*, Centre for Science and the Environment, New Delhi, 1999; Centre for Science and Environment, 'Definitions of Equal Entitlements', CSE Dossier Factsheet 5, New Delhi. http://www.cseindia.org/programme/geg/cdm_guide.htm.

243 See http://www.gci.org.uk for a list.

244 Already, carbon costs associated with international emissions trading schemes are encouraging some energy-intensive industries to think about relocating production abroad, and the same would likely happen if foreign countries had a surfeit of carbon permits to offer (Philibert *et al.*, *op. cit. supra* note 65, p. 22). Martin Pecina, chairman of the Czech Republic's Anti-Monopoly Office, noted in February 2006, for example, that the EU ETS is likely to induce Mittal Steel, which has plants in the Czech Republic, merely to increase output in Kazakhstan, beyond the reach of the EU ETS. 'At the same time, it would reduce production in the Czech Republic, and would even profit from the sale of the unused carbon credits,' Pecina noted, claiming that the EU ETS fails to protect the environment and should be abolished (Bouc, *op. cit. supra* note 88).

245 As one trade expert puts it, 'if a specific subsidy causes adverse effects to competing entities in foreign countries, then it can be actionable in the World Trade Organisation.' S. Charnovitz, 'Beyond Kyoto: Advancing the International Effort Against Climate Change' in Pew Centre on Global Climate Change, *Trade and Climate: Potential Conflicts and Synergies*, Washington, DC, 2003, http://www.pewclimate.org/docUploads/Beyond%20Kyoto%2Epdf, pp. 141–170. In the US, for instance, the Clean Air Act restricted imports of low standard reformulated gasoline in 1999, but the WTO forced the US Environmental Protection Agency to rewrite the rules to comply with the WTO rules. Similarly, a recent NAFTA dispute with the US forced the Canadian government to repeal its ban of MMT, a substance manufactured by US-based Ethyl Corporation (and which had been banned in the US), and to pay compensation to the company for profit losses.Heidi Bachram *et al.*, *The Sky is Not the Limit: The Emerging Market in Greenhouse Gases*, Transnational Institute, Amsterdam, 2003 http://www.carbontradewatch.org.

246 Dove, *op. cit. supra* note 30, pp. 45–47, 49.

247 White, *op. cit. supra* note 201.

248 Douglas Kysar, 'Law, Environment and Vision', *Northwestern University Law Review* 97, 2003, pp. 675–729, pp. 690–1.

249 Cramton and Kerr, *op. cit. supra* note 38; United States Congressional Budget Office, *Who Gains and Who Pays under Carbon-Allowance Trading?*, Washington, 2000; Dallas Burtraw *et al.*, 'The Effect on Asset Values of the Allocation of Carbon Dioxide Emission Allowances', Resources for the Future, Washington, 2002; Nathan Hultman *et al.*, 'Equitable Carbon Revenue Distribution under an International Emissions Trading Regime', Political Economy Research Institute, Amherst, 2002; J. Jensen and T. Rasmussen, 'Allocation of CO_2 Emissions Permits: A General Equilibrium Analysis of Policy Instruments', Ministry of Business and Industry, Copenhagen, 1998; L. Lane, 'Allowance Allocation under a Carbon Cap-and-Trade Policy', Climate Policy Centre, Washington, 2003; Ian Parry, 'Are Emissions Permits Regressive?', Resources for the Future, Washington, 2003; J. Pezzey, 'Emissions Taxes and Tradeable Permits: A Comparison of Views on Long-Run Efficiency', *Environmental and Resource Economics* 26, 2003, pp. 329–343.

250 Peter Barnes, 'The Regional Greenhouse Gas Initiative', 2006, http://onthecommons.org/node/789.

251 Cramton and Kerr, *op. cit. supra* note 38.

252 Robert Hahn and Robert Stavins, 'Trading in Greenhouse Permits: A Critical Examination of Design and Implementation Issues', in H. Lee, ed., *Shaping National Responses to Climate Change*, Island Press, Washington, 1995, p. 203.

253 Andrew Aulisi *et al.*, *Greenhouse Gas Emissions Trading in US States: Observations and Lessons from the OTC NO_x Budget Program*, World Resources Institute, Washington, 2005, p. 19.

254 Polanyi, *op. cit. supra* note 15; Harvey, *op. cit. supra* note 29.

255 Mitchell, *op. cit. supra* note 23.

256 The importance of the aesthetic appeal of such approaches has been highlighted by the distinguished University of Iowa economist Deirdre N. McCloskey: 'When economists are asked why almost all of them believe in free trade, they will say that it is a "theoretical" argument that persuades them. Further inquiry will reveal that it is in fact a pretty diagram that persuades them.'

257 Driesen, *op. cit. supra* note 93, p. 94.

258 Robert H. Socolow, 'Can We Bury Global Warming?', *Scientific American,* July 2005, pp. 45–55; Bert Metz *et al.*, eds., *Carbon Dioxide Capture and Storage: Summary for Policymakers and Technical Summary,* Intergovernmental Panel on Climate Change, 2005. For problems with this geosequestration 'solution', see, e.g., 'Carbon Dioxide's Great Underground Escape in Doubt', *New Scientist* 2560, 18 July 2006, p. 19; 'Plan to Bury CO_2 under North Sea', *the Guardian*, 5 September 2003 and German Advisory Council on Global Change, *The Future Oceans: Warming Up, Rising High, Turning Sour*, Summary for Policy Makers, Berlin, 2006, which notes that 'storing CO2 in geological formations under the sea floor can only be an "emergency" solution for a transitional period' (p. 5).

259 Metz, *op. cit.*, pp. 34–36. The German Advisory Council on Global Change, *op. cit.*, concludes flatly that 'introducing CO2 into seawater should be prohibited, because the risk of ecological damage cannot be assessed and the retention period in the oceans is too short' (p. 5).

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263 'Chile's Agrosuper Sells Credits from Pig Waste to Utilities', Bloomberg News, 20 September 2004.

264 Lohmann, *op. cit. supra* note 223.

265 'No Carbon Credit for the West African Gas Pipeline', http://www.eraction.org/modules.php?name=ERA_News&file=article&sid=33; 'Groups Slam Nigeria's Submission of Gas Flare Reductions for Carbon Credits', http://www.carbontradewatch.org/news/nigeria.html; 'Judge Orders Shell Nigeria MD and Petroleum Minister to Appear in Court', http://www.climatelaw.org/media/Nigeria.shell.april06.

266 Warwick J. McKibben and Peter J. Wilcoxen, 'The Role of Economics in Climate Change Policy', *Journal of Economic Perspectives* 16, 2, 2002, pp. 107–29, p. 126.

267 Hasselknippe and Reine, *op. cit. supra* note 150, p. 22.

268 Veronica Vidal, *La Aplicacion de Politicas sobre Cambio Climatico en el Sector Forestal del Ecuador*, Memoria de Investigación Doctorado en Gestión Ambiental y Economía Ecológica, Autonomous University of Barcelona, October 1999.

269 IPA Energy, *op. cit. supra* note 82, p. 3.

270 Grubb, *op. cit. supra* note 236, p. 138. World Bank officials, accounting firms, financial analysts and many businesses have all admitted, publicly or privately, that no ways exist to demonstrate that carbon finance is what made a project possible. In the words of PriceWaterhouseCoopers, 'financial additionality cannot really be checked by a validator'. Holcim Cement believes that the 'incentive provided by carbon credits, especially at their current price . . . cannot possibly prove decisive in investment decisions'. A New South Wales government spokesman attempting to defend a state greenhouse gas trading scheme accused of providing coal-burning power plants with huge windfalls recently flatly admitted that 'it is not possible to distinguish between production or investment decisions made as a result of the scheme and those that would have been made anyway' (Wendy Frew, 'Dirty Power Plants Making Millions out of Green Scheme', *Sydney Morning Herald*, 14 September 2005). Other trading experts as well have confessed that counterfactual without-project scenarios 'cannot be measured' (Carolyn Fischer, 'Project-Based Mechanisms for Emissions Reductions: Balancing Trade-Offs with Baselines' *Energy Policy* 33, 2005, p. 1807). There can be no single 'right' account of 'what would have happened without a project' (Erik Haites and Farhana Yamin, 'The Clean Development Mechanism: Proposals for Its Operation and Governance', *Global Environmental Change* 10, 2000, pp. 27–43).

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272 O. P. R. Van Vliet *et al.*, 'Forestry Projects under the Clean Development Mechanism', *Climatic Change* 61, 2003, p. 154.

273 P. M. Fearnside, 'Forests and Global Warming Mitigation in Brazil: Opportunities in the Brazilian Forest Sector for Responses to Global Warming under the "Clean Development Mechanism"', *Biomass and Bioenergy* 16, 1999, pp. 171–189.

274 Michael Lazarus, 'The CDM Quantification Challenge: Time for a More Standardised Approach', presentation at World Resources Institute/ World Business Council on Sustainable Development side event at the Ninth Conference of the Parties to the UNFCCC, Milan, 10 December 2003.

275 CEE Bankwatch, 'An Analysis of Additionality. The PCF's JI Project in the Czech Republic: Sixteen Small Hydropower Plants', Prague, September 2005.

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277 *ENDS Report* 354, July 2004, p. 6.

278 See http://www.emissions.de/index.htm.

279 Mark C. Trexler, 'A Statistically Driven Approach to Offset-Based GHG Additionality Determinations: What Can We Learn?', *Sustainable Development and Policy Journal*, forthcoming.

280 Grubb, *op. cit. supra* note 236, p. 229.

281 Hermann Ott and Wolfgang Sachs, 'Ethical Aspects of Emissions Trading', Wuppertal Papers No. 110, Wuppertal Institut für Klima, Umwelt, Energie, Wuppertal, May 2000.

282 *Financial Times*, 16 February 2005.

283 International Rivers Network, 'Comments Submitted to the Japan Consulting Institute (JCI) Clean Development Mechanism (CDM) Centre regarding Xiaogushan Large Hydroelectric Project (XHP)', August 21, 2005, http://www.irn.org/programs/greenhouse/index.php?id=050823xiaogushan.html.

284 Steve Bernow *et al.*, 'Free-Riders and the Clean Development Mechanism', World Wildlife Fund, Gland, Switzerland, 2000, p. 17.

285 Clean Development Mechanism, Project Design Document for Bumbuna Hydroelectric Project, n.d., http://cdm.unfccc.int/UserManagement/FileStorage/FS_756041443.

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287 Bruno vanderBorght, 'Assessment of Present CDM Methodologies', presentation at World Business Council on Sustainable Development side event at the Tenth Conference of the Parties to the UNFCCC, Buenos Aires, 10 December 2004.

288 'Executive Board Warns against Unlevel CDM Playing Field', *Point Carbon*, 16 May 2006.

289 Paul J. Georgia, 'Enron Sought Global Warming Regulation, Not Free Markets' *Roanoke Times*, 3 February 2002.

290 *ENDS Report* 352, May 2004, pp. 34–35.

291 For example, European, South Asian and Southeast Asian forest history is full of examples of destructive state or commercial projects legitimised by the claim that without them, the so-called 'tragedy of the commons' would result in despoliation as growing swarms of individualistic farmers loot a landscape unprotected by private property rights. Once projects legitimised in this way go into operation, they often undermine commons regimes which function in ways which prevent such looting. As a result, the projects end up encouraging the destructive, no-holds-barred local behaviour they claim to have opposed. The attempt of baseline-and-credit accounting to determine 'business as usual' scenarios paradoxically transforms the scenarios into moving targets, making honest carbon accounting impossible, with negative results for climate.

292 Lazarus, *op. cit. supra* note 274.

293 Van Vliet *et al.*, *op. cit. supra* note 272, p. 154.

294 Ben Pearson, *The World Bank and the Carbon Market: Rhetoric and Reality*, Clean Development Watch, Sydney, 2005, p. 22, http://www.cdmwatch.org. See also Clean Development Watch and Third World Network, *The CDM: Reducing GHG Emissions or Business as Usual?*, CDM Watch, Sydney, 2003, http://www.cdmwatch.org. See also Cameron, *op. cit. supra* note 83; *Financial Times*, 16 February 2005

295 Haites and Yamin, *op. cit. supra* note 270; Trexler, *op. cit. supra* note 279.

296 The voluntary market is subject to even less regulatory scrutiny than the 'official' Kyoto Protocol and EU ETS markets. Credits from some projects may well be quietly sold more than once. A trader who asked not to be named has noted that several 'offset' projects have been advertised on carbon retailers' websites for years and should have sold all their credits long ago, including a well-known biomass project in India. Sales of such credits are not recorded in any registry and there is no way for customers to check whether the credits have been sold more than once. The trader also claimed that some projects financed by governments for other reasons have subsequently sold carbon credits on the voluntary market through private retailers.

297 Editorial, *ENDS Report* 354, July 2004.

298 George Akerlof, 'The Market for "Lemons": Qualitative Uncertainty and the Market Mechanism', *Quarterly Journal of Economics* 84, 3, pp. 488–500; Michael Obersteiner *et al.*, 'Avoiding a Lemons Market by Including Uncertainty in the Kyoto Protocol: Same Mechanism – Improved Rules', IIASA Interim Report IR-00-043, International Institute for Applied Systems Analysis, Laxenburg, Austria, 2000.

299 Quoted in Keith Allott, 'Testing the Waters for Carbon Neutrality', *ENDS Report* 369, October 2005, pp. 24–26.

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301 See, for example, World Business Council for Sustainable Development and World Resources Institute 'Greenhouse Gas Protocol', http://www.ghgprotocol.org.

302 Drury *et al., op. cit. supra* note 123.

303 *Ibid.*

304 Biello, *op. cit. supra* note 217.

305 Driesen, *op. cit. supra* note 62, pp. 314–5.

306 Liroff, *op.cit. supra* note 166, pp. 16, 117.

307 *Ibid.*, pp. 83–6.

308 Jacob Werksman, 'The Clean Development Mechanism: Unwrapping the "Kyoto Surprise"', *Review of European Community and International Environmental Law* 7, 2, 1998, pp. 149-150.

309 Op. cit., p. 155.

310 Ellerman *et al., op. cit. supra* note 53, p. 318.

311 Lovbrand, *op. cit. supra* note 271, p. 452. See also Gregg Marland *et al.*, 'The Climatic Impacts of Land Surface Change and Carbon Management, and the Implications for Climate-Change Mitigation Policy', *Climate Policy* 3, 2, 2003, pp.149–57, p. 150.

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329 Victor, *op. cit. supra* note 34.

330 D. Read *et al.*, *The Role of Land Carbon Sinks in Mitigating Global Climate Change*, The Royal Society, London, 2001.

331 Fred Pearce, 'Drought Bumps Up Global

Thermostat', *New Scientist*, 6 August 2005, p. 16.

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333 J. G. Canadell *et al.*, 'Quantifying, Understanding and Managing the Carbon Cycle in the Next Decades', *Climatic Change*, 67, 2–3, 2004, pp. 147–160; Ian Sample, 'Warming hits "tipping point"', *The Guardian*, 11 August 2005.

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389 Oilwatch, *op. cit. supra* note 238.

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391 The bill for a CDM Project Design Document comes to €15,000 if the methodology involved has already been approved by the CDM Board, €45,000 if it has not. Hiring a Designated Operational Entity to 'validate' a project requires €7,000–15,000, and to 'verify' it at a succeeding stage still more. There are also costs connected with clearing a project with the Designated National Authority and getting approval from the CDM Executive Board. See http://www.cseindia.org/programme/geg/cdm_guide.htm.

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396 Drury *et al.*, *op. cit. supra* note 123.

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413 Jane Ellis *et al.*, 'Taking Stock of Progress under the CDM', OECD, Paris, 2004, http://www.oecd.org/dataoecd/58/58/32141417.pdf.

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Chapter 4
Offsets – The fossil economy's new arena of conflict

In which it is shown how projects designed to 'compensate' for continued fossil fuel use are helping to dispossess ordinary people of their land, water, air – and futures.

Introduction

Again and again, this special report has returned to the difficult truth that there is only one way of addressing the climate crisis: to keep most remaining coal, oil and gas in the ground.

To find a democratic way of doing so quickly seems a tall order in a world whose industrial societies are ever more dependent on fossil energy. As has been detailed in previous chapters, political and business leaders, experts and even many NGOs, while increasingly alarmed, even despairing, about climate change, have so far shown few signs of facing up to the end of the fossil era.

But, as this report has also stressed, there is at least one group – and a very large one – for whom the idea of leaving coal, oil and gas in the ground is not necessarily a revolutionary concept. These are people whose lives, livelihoods and land have already been damaged or devastated by fossil fuel exploration, extraction, refining, transport, use and all the institutions that surround them.

For this group, the struggle to stabilise climate – to stop the world's above-ground carbon dump from overflowing – is likely to look like only one chapter in a much longer and broader history. When indigenous peoples who have lost their lands through oil drilling meet others whose Arctic hunting grounds are falling victim to climate change, when communities battling the construction of gas pipelines that would pass over their common lands encounter fenceline communities whose children's health is ruined by air pollution from refineries or power plants, when opponents of airport expansion meet impoverished city dwellers who have lost their neighbourhoods to a hurricane strengthened by warming subtropical waters, awareness cannot but grow that, despite their differences, all such communities are facing a common struggle.

And now a new group is on stage: communities facing the new 'carbon-saving' projects that generate the credits bought and sold in the carbon market. Such projects – tree plantations, industrial gas destruction projects, and many others – not only help perpetuate the old problems of coal, oil and gas; they often bring new problems as well.

In order to generate carbon credits from trees or energy crops, plantation companies have to maintain their hold on land that ordinary people may need for other purposes. In order to generate carbon credits from burning the methane bubbling out of landfill sites, authorities have to fight to keep them open. In order to keep track of the carbon their agroforestry schemes generate, rural development organisations have to divert resources from their traditional work. In order to get carbon credits for halting flaring, oil companies have to go on drilling and polluting.

'Middle East nations call oil the "blood of the earth". No resource is more critical to [US] industry, security, and freedom… Let's open up the Arctic National Wildlife Refuge to drilling…pump out of the Strategic Petroleum Reserve… clear the way for exploration on the Outer Continental Shelf… Tell Saudi Arabia, Kuwait, and the sheikdoms of the Gulf that if they do not begin to pump enough oil to cut the price to USD 20 a barrel by fall, they can look elsewhere the next time war clouds descend over the Gulf.'

Patrick Buchanan, US presidential candidate, 2000

And all the while, new strip mines continue to be opened, oil continues to be spilled, and chemical pollutants continue to waft over power-generating plants. Every Clean Development Mechanism or Joint Implementation project set up under the Kyoto Protocol, or 'carbon offset' scheme launched by a private firm, helps perpetuate the fatal flow of fossil carbon out of the ground and into the air just as surely as any drill bit or transcontinental pipeline.

The fossil fuel economy's new frontier, in short, has become a new battlefield. Added to classic local conflicts over extraction, pollution,

and labour abuse are now, increasingly, local conflicts over 'carbon offsets' – the projects that license and excuse the extraction, the pollution and the abuse.

'Oil, the blood of the earth, has become, in time of war, the blood of victory.'

Henry Berenger, adviser to French Prime Minister Clemenceau, 1918

At first glance, these new conflicts may seem to be only indirectly connected to fossil fuels. People fighting industrial tree plantations in Brazil, for example, may never catch a whiff of the hydrocarbons whose release in Scotland the plantations are supposed to justify and excuse. But the struggle of the exploited community in Brazil and the polluted community in Scotland are, in a sense, one. In discovering the other's struggle, each, in a sense, rediscovers its own. The Kyoto Protocol and other carbon market schemes springing up around the world, in globalising the defence of fossil fuels in a new way, are also globalising conflicts and movements over fossil fuels in a new way.

Oil is the blood of the earth, and should not be taken away. We cannot do that.'

Berito Kubaruwa, U'wa, Colombian Amazon, 1998

In the past, the deeper meanings of dependence on fossil fuel could be understood by coming to grips with the experience of oil wars, polluted farmland, lung disease, militarisation, strip mines, disappearing forests and degraded ice caps. But this is no longer enough. Today, anyone who wants to understand what fossil fuel dependence means also has to look closely at the 'carbon offset' and 'carbon saving' projects now being set up around the globe, under the auspices of the Kyoto Protocol's 'flexible mechanisms', the World Bank and innumerable consultancies and other private firms; to ask questions about them; and to listen to the voices of those who are affected.

'No blood for oil.'

Antiwar slogan, 1990, 2002

Looking at tensions and conflicts in Guatemala, Ecuador, Uganda, Costa Rica, India, Sri Lanka, Thailand, South Africa and Brazil, this chapter brings together a few of these questions and voices. It attempts to introduce these struggles in the only way they can be introduced: through studying what actually happens on the ground.

The topic is difficult. As the last chapter has tried to indicate, the market in credits generated by 'carbon-saving' involves some of the most arcane and convoluted technical, legal and intellectual exercises ever devised in the service of perpetuating inequality and environmental folly.

But as elsewhere in this special report, a question-and-answer format may help bring the issues surrounding the new carbon market closer to open public debate. And as with previous chapters, it's hoped that questions will continue to be raised even after the last page is turned.

The beginnings – A story from Guatemala

The beginnings of the 'carbon offset' idea can be traced back at least as far as 1977, when the physicist Freeman Dyson speculated that large-scale planting of trees or swamp plants could be a cheap means of soaking up excess carbon dioxide in the atmosphere.[1]

But it wasn't until 1989 that the first forestry project funded explicitly to offset greenhouse gas emissions was set up.[2]

Applied Energy Service, Inc. (AES), a United States-based independent power producer, had been looking for a cost-effective technique for reducing carbon dioxide emissions at a new 183-megawatt coal-fired power plant in Connecticut in order to make the plant more acceptable to state regulators. On the recommendation of the Washington-based World Resources Institute (WRI), AES decided to try to 'mitigate' the plant's carbon emissions by offering USD 2 million to finance 10 years' worth of 'land-use activities and multiple-use forestry projects' in Guatemala.

The activities would be undertaken by the organisation CARE with the help of USAID and the Guatemalan Directorate General of Forests.[3] CARE had been working in agroforestry since 1974 in the Western Highlands – one of the country's few remaining highland areas with existing forest and the potential to offset significant quantities of carbon – and it was hoped that the AES money could leverage additional funds from other sources (debt-for-nature swaps) as well as volunteer services from groups such as the US Peace Corps.

Some 40,000 smallholder farmers would plant 50 million pine and eucalyptus trees in the course of establishing 12,000 hectares of community woodlots, 60,000 hectares of agroforestry and 2,880 kilometres of live fences. Some 2,000 hectares of vulnerable slopes in local watersheds would be protected and training provided for forest fire brigades to reduce the threat of fire and potential CO_2 release. During its first 10 years, the project would also train local communities so that its activities would become self-sustaining. In all, AES finance would make possible the sequestration of 15.5 to 16.3 million tonnes of carbon in Guatemala

– more than enough, it was claimed, to cover the 14.1 million tonnes the Connecticut plant would emit over its 40-year lifetime.[4]

Did it work?

No. In 1999, an external evaluation of the AES-CARE project showed that, even by its own carbon-accounting standards, it was falling far short of the 1 million tonnes of carbon it was supposed to have 'offset' to date.[5]

What happened?

Three scenes from the Western Highlands.

The project was built around the assumption that using the area for carbon production would be compatible with improving local quality of life through increasing agricultural productivity, watershed protection, and improved fuelwood access. But the designers didn't sufficiently grasp what the project would mean for farmers in their local political context.

First, many of the mainly indigenous subsistence farmers in the project area in the Western Highlands had been pushed to the edge of the agricultural frontier as land in the fertile lowlands became concentrated in the agribusiness sector. The Western Highlands encompass the country's poorest communities and most environmentally degraded areas. More than 90 per cent of rural households live in absolute poverty,[6] and with population densities exceeding 100 people per square kilometre and a deforestation rate of 90,000 hectares per year, erosion and land degradation have led to an intensification of rural land use even as poverty rates increase. The average family in the Western Highlands has access to less than one hectare of land for farming.

Yet at the same time, land with official forest status was often declared off-limits to continued agricultural use under Guatemala's 1996 forest law. The government was trying to re-locate control over communal forests into the hands of municipal authorities, and the law criminalised subsistence activities such as fuelwood gathering.

Well, wasn't that a good thing? It helped protect the carbon stored in the trees.

What it did first and foremost was to take access to the trees out of the hands of ordinary people. One result was that conflict grew between municipal and village authorities and individual landowners. Another was that reforestation looked less attractive. Who wants to plant trees if by doing so you deprive yourself of daily necessities? A third result was increasing distrust of government forest offices, some of which were partly funded by the CARE/AES Agroforestry Project. Not a

good outcome, whether your objective was people's welfare or long-term carbon savings.

Then, too, in the early years of the project, the tree species promoted were often inappropriate for the climate and for degraded land areas. Damage by animals and sabotage of replanted areas also limited the expansion of reforested areas.

But what about agroforestry systems, which allow farmers to make use of the carbon-sequestering areas?

Agroforestry systems are indeed more attractive to local farmers, as they serve multiple purposes (grazing, fodder and fuelwood provision, and subsistence or cash-crop components). But they typically take three to five years to become productive. That also makes them a difficult option for families with limited land.

So it was hard to reconcile local people's needs with the goal of carbon production.

In more ways than one. Another problem was CARE's need to channel more and more of its limited personnel and finance into monitoring and measuring carbon instead of trying to improve people's lives.

In the past, CARE had had a respectable record of promoting sustainable agriculture and agroforestry, and even some success in protecting water sources through reforestation, although less so in the Western Highlands. The organisation had a great deal of experience in training local community extension agents, providing seeds and tree nursery supplies, and training local people in soil conservation, fodder production and watershed management. CARE extension agents also provided advice and materials for improving grazing areas and soil recuperation, services that local project participants continue to evaluate positively.

The new carbon focus for its work, however, meant that finance and staff time began gravitating away from agroforestry towards reforestation, and away from farm extension work towards unfamiliar work in modelling and monitoring carbon emissions benefits.

Couldn't the staff do both things at once?

It's not so easy. Carbon accounting is specialised, complicated work. The market needs hard carbon numbers. You can't just look at a couple of trees and say that they will have soaked up the carbon equivalent of one 1000-kilometre airline flight by 2020. You have to look at growth rates, soil changes, interaction with local communities, how

Villagers in CARE's target area.

The research on Guatemala on which this section draws was carried out by Dr Hannah K. Wittman of Simon Fraser University. It was conducted in the context of a participatory evaluation (that included community mapping and a household-level questionnaire) of CARE's agroforestry extension programme, operating in two villages in the municipalities of San José Ojetenam and Ixchiguán in the state of San Marcos in the Guatemalan Highlands.

much greenhouse gas the landscape would have released compared to what would have happened without the project. In fact, if you look carefully enough, as Chapter 3 has argued, you find you can't do the calculations at all.[7]

The complexity (or impossibility) of this new job played real havoc with CARE's original mission. CARE was used to training and agricultural extension, not carbon monitoring. In 1999, the organisation still didn't have a methodology in place for measuring and monitoring carbon in agroforestry plots and forests.

An external evaluation conducted in 1999 by Winrock International laid down the law: the project's certified carbon production had to be improved to make it 'more acceptable as a CDM-type of project'.[8] A land-use mapping system using a Geographic Information System had to be developed together with remote sensing technologies that could track project changes. 'Proxy areas' had to be identified to serve as a 'without-project' baseline, and a carbon-monitoring programme for all project activities for which carbon credits would be claimed had to be set up.

In short, the Winrock evaluators, mindful of the requirements of the carbon market, reversed CARE's own emphasis on livelihood over carbon sequestration. By 2000, CARE officials were openly discussing the possible need to redirect resources formerly channelled to extension activities to pay outside consultants to develop carbon accounting methodologies.

But surely most of CARE's agricultural extension work went on as before?

Not necessarily. The new carbon rules were an incentive to CARE to shift its reforestation focus to larger farmers, who had more resources available to undertake reforestation projects and were thus better equipped to help CARE comply with its carbon sequestration commitments.

The new carbon focus of CARE's work also made its objectives and premises harder to share with farmers. Even as of 2000–01, farmers were not being told what the project was about, nor how their reforestation and fire brigade efforts contributed to carbon mitigation, nor what the impacts on them of a changing climate might be. Nor were they even directly paid for their reforestation activities. That, of course, made it impossible to discuss with them their role in, or rewards for, offsetting Northern carbon emissions, or to ask them how their own knowledge might improve carbon sequestration design or dissemination. 'Participatory' carbon sequestration it was not.

From the Netherlands to the Andes – A tale from Ecuador

The Dutch FACE Foundation, or 'Forest Absorbing Carbon Dioxide Emissions', was established in 1990 by the Board of Management of the Dutch Electricity Generating Companies. The original idea was to establish 150,000 hectares of tree plantations to compensate for the emissions from a new 600-megawatt coal-fired electricity generation plant to be built in The Netherlands. 'For reasons of land availability and cost-effectiveness', FACE explained, 'greater emphasis has been placed on collaboration with developing countries and countries in transition'.[9]

Since 2000, the FACE Foundation has been producing and selling carbon credits from tree plantations as an independent, non-profit organisation. It trades the credits through two Dutch companies: Business for Climate (set up by FACE in 2002 jointly with Triodos Bank and Kegado BV) and Triodos Climate Clearing House.

The FACE Foundation has five projects worldwide: in Malaysia, the Netherlands, the Czech Republic, Ecuador and Uganda. The FACE Programme for Forestation in Ecuador S.A., or PROFAFOR, currently the largest, was set up in 1993. PROFAFOR has not been approved as a UN Clean Development Mechanism (CDM) project. But it does see itself as 'potentially CDM-compliant' – as sequestering carbon over and above what would have been the case otherwise, as providing social, economic and environmental benefits, and so on.

PROFAFOR originally thought to plant 75,000 hectares of trees, but later revised this goal downward to 25,000 ha. So far contracts have been signed for the plantation of 24,000 ha, and 22,000 ha have actually been planted. Initially, PROFAFOR activities were focused on the Andean region, or Sierra, and 8,000 ha have been planted under contract with 39 indigenous mountain communities. However, since 2000, contracts have also been signed in Ecuador's coastal region.[10]

Well, planting trees is bound to be a good thing for everybody involved, isn't it?

It's not so simple. The Sierra sites used by PROFAFOR are located in a biome known by the colonial Spanish term *paramo* – which denotes high altitude plains or barren plateaus without woodlands. This zone was never forested, although it does support some trees. The dominant vegetation is Andean grasses from the genuses *Festuca, Stipa, Calamagrostis* and *Deyeuxia*.

Paramo soils.

The dark, volcanic *paramo* soils have a complex particulate structure that, in the cold, moist climate of the Sierra, enables them to retain a great deal of water and organic matter. The soils have a far greater capacity to hold water than the vegetation covering them, although a layer of plants is important to keep moisture in the soils during dry seasons. In the humid but not high-rainfall Sierra environment, *paramo* soils are believed to be the main water reservoirs for the local inhabitants.

Although indigenous agriculture has been practised for hundreds of years up to 3,500 metres (the Sacred Valley of Cuzco, a centre of indigenous agriculture, lies at around 3,000 metres), the ecological balance of the *paramo* above 3,200 metres is very fragile. If the plant cover is removed even temporarily, evaporation from the surface increases and organic matter in the soil begins to decompose, resulting in reduced capacity to hold water. Once dry, the soils cannot recover their original structure and organic content, even when they get wet again.

The monoculture tree plantations PROFAFOR sets up to fix carbon are a bizarre and damaging innovation in this environment. The species used are exotics commonly used in industrial plantations elsewhere. Some 90 per cent are pine, either *Pinus radiata* (particularly in the provinces of Carchi and Chimborazo) or, to a lesser extent, *Pinus patula* (mainly planted in Cañar and Loja). Eucalyptus and cypress species make up another 4 per cent.

But what's wrong with pine trees? PROFAFOR says that experiments with pine in different places get different results and that 'it cannot be categorically stated that pine is noxious for paramo soils.'

PROFAFOR's non-indigenous pines dry out and crack the soils, not only because they disturb the existing vegetative cover, but also because they use a great deal of water. Organic matter and biological activity decline, uncompensated for by the fall of pine needles. Soils tend to be transformed from water retainers to water repellents, and surrounding flora and fauna are deprived of food and habitat.[11]

The threat is not only to local hydrology, but also, ironically, to local carbon storage capacity. Subject to less extreme variations in temperature and humidity than the drier Southern Andean zone known by the indigenous term *puna*, the *paramo* stores in its thick layers of soil vast amounts of carbon – perhaps 1,700 tonnes per hectare in the case of Carchi province, more than a tropical forest – but only as long as the soils are not exposed to the air and to increased erosion through planting operations and firebreaks.

Under the PROFAFOR project, villagers are obliged to construct firebreaks in which the *pajonal* grasses protecting the soil of the *paramo* are uprooted in a strip bordering the plantation, leaving the soil exposed.

In addition, the carbon in the trees is at risk from fire. In the community of SigSig in Azuay province, fires have already killed or stunted the growth of many pines. And fires are likely to recur continuously, given a fire-prone natural flora, traditional burning practices used to encourage fodder regrowth, strong winds, firebreaks that are too few and too narrow, and the lack of permanent wardens or fire-fighting equipment. The yellowish needles appearing on numerous local stands of *Pinus patula* signal the species' poor adaptation to the Andean environment, possibly indicating lack of a crucial micronutrient or of the mycorrhizal fungi that facilitate the tree's nutrient absorption in its native environment. Animals have meanwhile broken off many terminal shoots, giving rise to a bushy growth, which may prevent the trees from developing trunks suitable for the sawmill. Growth is slow.

Wait a minute. Are you telling me that a project which was designed to absorb carbon may actually be emitting it?

'At an assembly this engineer told us that thousands of dollars would enter the commune [for tree-planting]…that afterwards we were going to have sources of work till after the harvest, that we were going to collect who knows how much money. And the assembly signed…you know, sometimes we country people, we don't know, we fall for it naively.'

SigSig community member

Scholar Veronica Vidal found not only that the soils in PROFAFOR plantations are releasing more carbon than the firm takes account of, but also that the pine plantations are capable of absorbing less carbon than the firm claims. She concluded that the net carbon balance in PROFAFOR plantations may well be negative: 'We are facing a lose-lose situation, in which those who most lose are the future generations that will have to face the problems of climate change.'[12]

But according to PROFAFOR, local soils have been 'degraded by extensive use', and planting pine and eucalyptus in the paramo will restore them and prevent erosion.

Although some of the sites used by PROFAFOR, situated between roughly 3,200 and 4,800 metres, have been used for grazing, they have not usually been cultivated, due to their remoteness and the harsh climate. The idea that the soils on these sites, which still fulfil their original functions, are being degraded in any way that pine plantations could remedy is simply false. As for erosion, it is the pine plantations and their firebreaks themselves that are likely to create the greater problem.

Wait, I'm getting confused here. PROFAFOR says that this environment is in bad shape. Following the Spanish conquest, many indigenous peoples had to retreat to high altitudes because Hispanic and mestizo *communities were spreading out in the inter-Andean valleys and the Spaniards were taking over land for large estates or private ranches. The land reform laws of 1964 and 1973 helped intensify the exploitation of the* paramo *even further by transferring higher, less productive areas of* hacienda *lands to indigenous peoples. Today, agriculture is being practised up to 3,900 metres, and cattle-raising up to 4,500 metres.*[13] *On its plantation sites, PROFAFOR says, the land is so degraded that farming is just 'not profitable and the land is not suitable for subsistence activities'.*[14] *In this context, surely pine trees will be both an ecological and an economic improvement, no? And a way, as PROFAFOR puts it, of 'taking advantage of land that is not being used and that could generate income to the local economy'?*

Confusion is only to be expected in a situation like this, in which PROFAFOR is saying one thing (largely to an international audience) and local people are saying another thing (largely to themselves).

But it's useful to remember that there's a long global history to the kind of claim that PROFAFOR is making, that a certain set of common lands are 'waste', 'degraded' or 'unused', and are idly waiting to be brought into the commodity market before they can become 'productive'. It's a claim that was used in the Americas during the colonial era to seize indigenous peoples' cropland and hunting and gathering

grounds and transform them into the private property of Europeans. It has also been used in India, with more mixed success, since the colonial era, and in Africa as well. And it was used in Europe during the great eras of enclosure 200 and more years ago. In each of these cases the claim concealed and justified takeovers of land that was not only usable and ecologically rich, but used for all sorts of livelihood purposes. And the same is true of the *paramo*.

PROFAFOR's says that it would have liked to use native species but that 'the majority of native species have almost disappeared, and local knowledge of indigenous tree species has been lost with the trees.'[15]

Although the *paramo* zone has never been thickly forested, people there retain a knowledge of native trees. In one PROFAFOR area, San Sebastián de SigSig in Azuay province, villagers are easily able to name and describe uses for a dozen native species.[16] Yet the only Andean tree species used by the PROFAFOR project, and on a very small percentage of its sites, is *Polylepis incana*. This is a sub-*paramo* species and it too is being planted in monoculture.

The English-language PROFAFOR brochure says that local people 'have a say in species selection and they prefer planting non-indigenous pine and eucalyptus species.'[17] *And the Ecuadorean government sees PROFAFOR as contributing to its own plans for afforesting or reforesting 250,000 hectares in the Andean zone over 15 years.*

But what do local people themselves say about the pine plantations? Lets look at the history.

PROFAFOR said the communities would get both income and employment from the project. In addition to payments per planted hectare, they would get seedlings, technical assistance and training. They would have work for many years. They would have access to the plantations to collect mushrooms, resins, firewood and wood from thinning. And after 20-30 years they would be allowed to harvest the trees and sell the timber. All PROFAFOR asked in return was 100 per cent of the rights to the carbon fixed in the trees. It sounded terrific.

I have a feeling you're going to tell me that things didn't turn out as promised.

That's an understatement. Let's start by looking at what happened in three communities that signed contracts with the company between 1997 and 2000. Communities were offered payments of between USD 165 and USD 189 per hectare planted. But the cost of plants and technical assistance during the first three first years of plantation was then deducted, leaving the communities with about half of what they were initially offered (see Table 5).

Pine plantings in Ecuador.

Table 5. Offered and actual payments for plantations

Community	Area leased	Payment agreed per hectare (in USD)	Total amount offered (in USD)	Deductions for plants and technical assistance (in USD)	Amount disbursed to the community (in USD)	Percent deducted
San Sebastián de SigSig	400 ha	$189	$75,600	$36,800	$38,800	49%
Pisambilla	300 ha	$165	$49,500	$22,500	$27,000	46%
Mojandita Avelino Dávila	130 ha	$165	$21,450	$9,750	$11,700	46%

Source: PROFAFOR Forestation contracts

When SigSig community asked how much technicians were being paid for this technical assistance, they were told that PROFAFOR did not have the 'capacity to ask for these reports . . . it is an administrative matter'. Meanwhile, the price of the planting stock doubled or tripled. And in the end it was the commune, and not PROFAFOR, as specified in the contract, that had to transport the stock from the nursery.

Well, but little misunderstandings like this will crop up in every business transaction. You just have to get on with it. What does this have to do with the big picture of addressing climate change?

It doesn't end there. After having deducted the cost of the seedlings and technical assistance, PROFAFOR was obligated to pay 80 per cent of the remainder in three instalments during the first year after the contract was signed – as long as it wasn't necessary to replant more than 25 per cent of the seedlings. The remaining 20 per cent was then to be handed over to the community 'following complete fulfilment of the activities foreseen' by the company for the second and third year after the contract was signed.

There were several problems here that villagers weren't ready for. First, when trees die because they 'do not adapt', the community has to take on the cost of new seedlings for re-plantation. This happens quite frequently, because of the quality of the plants, the cold and windy conditions of the high-altitude plantation areas, or for other reasons. According to Mary Milne of the Centre for International Forestry Research, the re-plantation rate for PROFAFOR is 'between 15 and 30 per cent and costs range between USD 865 and USD 5,820, which have to be absorbed by the communities.'[18]

A bigger problem is that because of the necessity of guaranteeing a long lifetime for the carbon sequestered in PROFAFOR's trees, each community has to maintain the trees itself for 20–30 years before being allowed to harvest them and sell the timber. (More recent

PROFAFOR contracts demand even longer terms, of up to 99 years.) But the money runs out long before that. Nor are the communities given any information on where or how they might market the timber.

But it's not only a money matter. The PROFAFOR contract also ensures that the community turns over communal land and labour to the company for free.

How does that work?

Well, take land first. Under the contract, PROFAFOR gets – rent-free – large tracts of community land, which then cannot be turned to any other purpose than the production of carbon credits for the international market for 20 or 30 years.

This is not farmland. Cultivation goes on in other zones of communal property where the land has already been divided up among families. But PROFAFOR is wrong to say that the land is 'degraded', 'is not being used' or 'is not suitable for subsistence activities', and that it is idly waiting to be transformed into an asset by being 'incorporated into the national economy'.

In addition to having important hydrological functions, much of the land is used for grazing or could be rented out for that purpose. When the plantations are set up, families owning cattle may have to rent other lands for their animals, purchase fodder, or reduce their herds. This has an impact on family savings, not only because the monetary compensation villagers get from PROFAFOR is too small and must be used immediately for plantation expenses, but also because, by its nature, cash cannot play the role of the more stable, less liquid, traditional savings embodied in family cattle.[19]

Small wonder that local people feel that they have essentially transferred the land and its potential to generate savings for exclusive PROFAFOR use. As one said, 'We cannot touch or do anything on the area signed over.'

And does PROFAFOR really also appropriate communities' labour for free? PROFAFOR claims that it provides thousands of well-paid jobs to indigenous communities in Ecuador.

A lot of these jobs are, in fact, onerous and unremunerated tasks that the communities find themselves unwillingly taking on because of debt. In fact, PROFAFOR has not only failed to provide the jobs it has offered, but has also forced communities to hire people from outside to carry out PROFAFOR work. Local people, it turns out,

often do not possess the necessary technical skills PROFAFOR management plans require. PROFAFOR's training – workshops for two leaders from each community, held in hotels or other venues in nearby cities – is widely seen as insufficient and too theoretical. In addition, the plantations are often too remote or subject to too extreme climatic conditions for local people to work on themselves.

Where tasks remain incomplete, the community has to fall back on its own unpaid labour pool – a system called *minga* – to fulfil its contractual obligations. Essentially, villagers are forced to exploit their own system of free communal labour in order to escape debt (see box below).

Minga: *Organising Labour without a Market*

Minga is a communal pool of non-marketed labour typical of the indigenous communities of the Andes. Among the Quechuas, *minga* is directed at a specific collective material objective: planting and harvesting, or building or maintaining access routes, irrigation channels, schools or health centres. It is a complex mechanism for social interaction in which, generally for one day each week, both men and women, adults and children, are mobilised.

People working under *minga* receive no money. Rather, the system is one of reciprocity and mutual help. When *minga* is granted to achieve individual purposes, the *mingado*, or beneficiary, enters into an obligation to return *minga* to the *mingueros*, or workers, at some point in the future.

As one villager from Chuchuqui said: '… they paid for dibbling for pine only, not for eucalyptus. And they did not pay me, I worked under *minga*… Where we could not work, they hired people from Quito and Chimborazo and the community paid the workers.'

But surely the communities must have made some money out of the deal?

Well, it's instructive to try to do the maths. Look at what happened to SigSig. The community was to receive about USD 75,000 for 400 hectares of *Pinus patula* plantation to be sited on land a three- to four-hour walk from the settlement's centre, at approximately 3,700 metres. Plotting, dibbling, planting and construction of the firebreak were carried out between June 1998 and December 1999. But some of the seedlings didn't take, and the community had to hire outside labour to replant, using the funds supplied by PROFAFOR. The community built a house in the area of the plantation in mid-1999 and a guard was hired for the first two years.

In 2000 and again in 2004, fires swept through large parts of the plantation. The community had to take on most of the costs of replanting – including labour, transportation and food – with PROFAFOR

picking up only the costs of seedlings. The community has also had to take responsibility for replanting, due to maladapted trees dying. Yet the 20 per cent of the funds that should have been disbursed to the community three years after the contract was signed in 1998 have still not been received. And the plantation has to be maintained for nearly 15 more years until harvest. To top it off, if the community decides not to continue carrying out PROFAFOR's plantation work at that time, it must hand over 30 per cent of the income from the sale of the timber to the company.

In a workshop conducted with SigSig residents, an attempt was made to draw up a balance, showing how much the community had gained and lost from its agreement with PROFAFOR, although much of what the community put into the plantations cannot be satisfactorily quantified, such as the *minga* and the work of the community leaders. Calculations were made for plotting, dibbling, firebreaks, right of way, replanting, seedlings, maintenance, management, training and so forth.

The community concluded that, even without taking account of the value of the environmental liabilities the project has saddled local inhabitants with, or the cost of the plantations for another 15 years in terms of labour, inputs, insurance, security, tools, harvest and timber marketing, its losses already amount to over USD 10,000.

Isn't there anything the community can do to save the situation?

PROFAFOR has a lot of power in this context. Once a contract is signed, there isn't much communities can do to modify it, even when, as in SigSig, the agreement with the company was signed by only 50 community members when there were over 200 registered.[20]

PROFAFOR can even claim payment of compensation if its staff decides that a community has not fulfilled its obligations. This compensation can amount to up to triple the original payments to the communities, or many tens of thousands of dollars (see Table 6, below).

One villager reported: 'When I told the engineer Franco Condoy that we wanted to undo this agreement, he told us: "You cannot rid yourselves of the agreement, the commune is mortgaged."'

According to Ecuadorian law, Condoy is wrong. Communal property of indigenous communities is not subject to mortgages or land tax. Mortgages can only be contracted with private estate and landholders, individuals or corporate bodies.

'We made an assessment and…it was like a bucket of cold water. On doing our accounts, we realised how much money we have put in, and the trees are still small…Although we have no money left…we have to look for a warden to look after the plants and pay him, we have to prune, we have to put down manure, all the care and then the harvest…we ourselves have to find a [timber] market… How is that?! We are depleting our land, we are providing labour, doing harvesting and also giving 30 per cent.'

SigSig community member

Table 6. Penalty amounts in relation to paid and offered amounts

Source: PROFAFOR Forestation Contracts

Communities	Amounts initially offered (USD)	Amounts disbursed to community	Amounts of penalty clause	Penalty/ disbursement ratio
Caguanapamba	n.a.	$15,716	$42,660	271%
San Sebastián de SigSig	$75,600	$38,800	$108,000	278%
Pisambilla	$49,500	$27,000	$81,000	300%
Mojandita Avelino Dávila	$21,450	$11,700	$35,100	300%

In practice, however, Condoy is right, since even contracts involving common property are subject to penalty clauses and fines in the event of a breach, and PROFAFOR is well able to enforce mortgage-like arrangements by taking advantage of the inter-ethnic power relations that are a legacy of the colonial era in the region.

In one community, Caguanapamba, where the leaders who had signed the contract mismanaged the PROFAFOR funds they were entrusted with, community members did not get paid for the first planting operation and many seedlings were lost. The leader who succeeded them will now have to use the last instalment of funding in order to pay off the people who did the original planting. To complete the firebreak, he has had to rent a machine with community funds and rely on labour from *minga*.

All right, I can see that things haven't all gone according to plan with carbon sinks in the Andes. But so what? Can you draw any general conclusions from all this?

Carbon trading theory says that Southern countries have a hitherto unrecognised and unpriced resource in the form of spare or unused carbon-absorbing potential. By bringing this dormant, unexploited resource into something called 'the market', the theory goes, the South will be able to transform it into living capital or exchange it for cash or other things, adding to its wealth and to that of world society as a whole.

Over hundreds of square kilometres of the Ecuadorian Andes, new transactions involving carbon are indeed being made. But for the most part, they are not textbook 'market' transactions, nor do they address climate change, nor have they resulted in communities' realising new value from formerly unused assets.

Instead, common land, community labour and much of the paltry

but crucial savings of peasant communities have been transferred to a private firm for production of a new commodity which, although largely notional, has the material effect of shoring up an anachronistic pattern of fossil fuel use in The Netherlands. While claiming to 'absorb' carbon, PROFAFOR has in fact been absorbing Andean wealth while helping to enlarge the North's ecological footprint in the South. Indirectly, it is also transferring wealth from future generations to the present, through its failure to address climate change.

The section on Ecuador is extracted from the research of Patricia Granda, who studied the FACE-PROFAFOR project for Accion Ecologica, an Ecuadorian NGO, and the World Rainforest Movement.

The mechanisms that have done the real work in making this transfer possible are not the abstract, benign 'wealth-creating' trade mechanisms of economics textbooks. On the contrary, they are mechanisms that compel, discriminate, narrow choices, increase dependence, reduce transparency, and centralise power and knowledge in bureaucracies and expert institutions – just the sort of thing that 'markets' are commonly seen as combating. These mechanisms include:

- Unfamiliar tree species planted in exclusive monocultures and requiring extensive technical intervention.
- Non-transparent and exploitative written legal contracts backed by historically-ingrained unequal power relations, through which a private company retains 100 per cent of the carbon sink credits from plantations while local communities take on debt and responsibilities for maintenance and managing environmental impacts.
- An internationally disseminated discourse, according to which the lands to be used for plantations have been 'degraded' by excessive use and cannot be 'profitably' used for subsistence activities such as cattle-raising.
- Expert procedures of 'verification' of carbon flows that by their nature are resistant to public scrutiny.

One last technocratic mechanism that makes PROFAFOR's manufacture of carbon credits possible is 'forest certification', a seal of environmental and social approval that was granted to 20,000 ha of PROFAFOR's plantations in 1999 by the Forest Stewardship Council (FSC). The FSC is an independent international body with membership from both industry and NGOs, but the actual job of deciding whether a plantation meets FSC standards falls to private firms hired by the plantation company. In PROFAFOR's case, this was the Societé Générale de Surveillance (SGS), which has also certified PROFAFOR's carbon sequestration.

These certifications reassure buyers who will never visit the Andes that PROFAFOR's product is a valid, environmentally-friendly commodity from plantations that 'strive to strengthen and diversify the

local economy' and 'maintain or enhance the long-term social and economic well-being of forest workers and local communities'.

Ironically, the SGS certifiers noted as one of PROFAFOR's strong points the 'participation of local communities in decision-making', as well as PROFAFOR's continued 'commitment' to use native species.

Local communities' lack of power to object to such claims helps lubricate PROFAFOR'S international trade in carbon credits. No community member interviewed by Patricia Granda in 2004 even knew of the existence of the FSC, nor of its Principles and Criteria, nor how they might be enforced. Here, too, environmental markets have failed to live up to their image in economics textbooks.

The story continues – Carbon forestry in Uganda

One thing can be said for the US-Guatemala carbon trade mediated by CARE described in a previous section: it at least *attempted* to square the production of carbon for the North with local social goals. It would be difficult to say the same for a Norwegian project to grow carbon credits in Uganda that started up a bit later. Journalist Harald Eraker, who investigated the project, labelled it as a case of 'CO_2lonialism'.[21]

The Uganda project was closely tied to the construction of conventional gas-fired power plants in Norway by Naturkraft and Industrikraft Midt-Norge corporations. The plants were supported by Norway's Labour Party, Conservative Party and Progress Party on the ground that they could be made environmentally-friendly through the purchase of carbon credits.

Some of these credits were to be provided by Tree Farms, a Norwegian forestry company operating in Africa. In 1995, Tree Farms (or Fjordgløtt, as it was then called) had received a grant from NORAD, the Norwegian aid agency, to explore the scope for activities in East

Africa.[22] The following year, the company set up in Tanzania and Uganda, and, later, in Malawi as well. In Uganda, it obtained from the authorities an extremely low-cost 50-year lease on 5,160 hectares east of the town of Jinja in the Bukaleba forest reserve on Lake Victoria, which it planned to plant mainly with eucalyptus and fast-growing pines. Bukaleba is one of more than 700 large and small state-owned central forest reserves set aside for forestry and forest protection, covering in all 7 per cent of the land area of Uganda.[23]

Shortly after the Kyoto Protocol was adopted in December 1997, Fjordgløtt increased its capitalisation and invited outside investors to buy shares. By 2000, Tree Farms controlled at least 20,000 hectares of land in the region and was in the process of acquiring a further 70,000 in Tanzania (see box on page 242: 'The Money Came from a Place Far Away': Tanzanian Land, Norwegian Carbon). The firm had planted 600 hectares, mainly with fast-growing pines (*Pinus caribaea, P. oocarpa, P. tecunumani*) and eucalyptus (*Eucalyptus grandis*), with Industrikraft Midt-Norge securing a first option on the associated carbon credits.

Norwegian journalist Harald Eraker investigated early attempts by Norwegian power and forestry firms to sequester carbon on Ugandan land.

What does the Ugandan government get in return for turning over its land to this company for 50 years?

It gets a one-off fee of USD 410 and an annual rent of about USD 4.10 for each hectare planted with trees. The rent, paid in fast-depreciating Ugandan currency, is adjusted every 10 years according to the index of inflation as defined by the Bank of Uganda. No rent is paid for areas that the companies have not planted with trees. For six square kilometres of plantation established by 2001, then, Tree Farms had paid Uganda, when inflation is factored in, less than USD 11,000. For 50 years' use of the same area of land, given current rates of inflation, it was set to pay less than USD 110,000.

That's outrageous!

Yes. Several years after the deal was made, the deputy commissioner for forestry in the Ministry of Water, Lands and Environment, Ignatius Oluka-Akileng, told NorWatch, an independent news service monitoring Norwegian business activities abroad, that the authorities had recently realised that investors were 'taking advantage of the system' to get cheap land.

The fact that no rent is paid for areas not yet planted with trees makes such arrangements particularly attractive to land speculators. Yet it has proved hard for the Ugandan authorities to negotiate better terms. According to one reliable source, when Ugandan officials tried

to negotiate a higher rent for 12,000 hectares in the Kikonda forest reserve with the Institut für Entwicklung und Umwelt, a German company headed by a former politician in the European Parliament, the company refused, saying: 'Our plane to Germany leaves tonight; if you don't sign now, there will be no deal.'

One problem is that forest authorities often simply don't know how much foreign companies might profit from carbon trading (see box on page 271: No Need to Know? The Secret Economy of Carbon), or how long they plan to keep plantation land out of other uses to ensure that carbon continues to be stored on it. Forest authorities, to say nothing of local people, are also poorly equipped to confront ministers, politicians and government climate negotiators who take advantage of their position and inside knowledge of European corporate and governmental carbon plans to get funding that helps them gain control of 'degraded' state forest land.

Well, it's not as though the land is being used for anything else.

Actually, it is. Since the 1960s and 1970s, local farmers and fishermen have moved in and out of Norwegian as well as German concession areas in Bukaleba. In fact, many people had migrated into the area already by the early 20th century. Although an outbreak of sleeping sickness then caused people to flee, when the tsetse fly vector was brought under control in the 1970s, people moved back to Bukaleba, and Idi Amin authorised a cattle-herding project in the middle of the reserve. Politicians under the Milton Obote regime in the 1980s also supported settlements in the forest reserve, one minister observing that 'trees don't vote, but people do.'[24] People were once again evicted in 1989-90. Crops were destroyed and houses torn down. Most evictees settled just outside the borders of the forest reserve, but then slowly started venturing back into the reserve to farm and fish. By 2000, five fishing and farming villages were inside the Tree Farms area in the Bukaleba forest reserve, and people from at least eight villages outside the reserve were cultivating the earth on Tree Farms' lease. Iganga district, the location of the reserve, was densely populated with migrants from other parts of Uganda, as well as from neighbouring countries. With scant opportunities for work outside agriculture, and with growing numbers, pressure on land was strong.[25]

But these people must be there illegally.

According to state law, yes. But some farmers claim that they are the rightful owners, having bought the land they are now working back in the 1980s, or that the land they are farming has been owned by their family for generations.

In 2000, forest authorities told Tree Farms that farmers and fishermen living in or using the Bukaleba reserve had been served notice to vacate.[26] Tree Farms' managing director had left the job of evicting farmers to the authorities, stating that the company would not do 'the dirty job of throwing them out' itself.

Apart from the people from the fishing village Walumbe Beach, however, no one interviewed by NorWatch in 2000 said that they had been given notice to leave the reserve. Several had heard rumours about it, while others were clearly surprised at the news. Some hoped that they might be allowed to stay – a hope perhaps based on the fact that the environmental impact assessment comes close to recommending that fishermen be allowed to stay to avoid social unrest.[27] Almost every farmer and fisherman told NorWatch that they had no other place to go, let alone land to farm. All expressed fears for the future, and asked NorWatch to convey to the Norwegian owners of Tree Farms their request that they be allowed to stay, or at least to farm or fish in the reserve.[28]

'When the UWA people came with their tree-planting activities, they stopped us from getting important materials from the forest. We were stopped from going up to get malewa *(bamboo shoots), which is a very important traditional food in the area and is a source of income. There were certain products that we used to get from the forest for the* embalu *ceremony (circumcision ritual) to be performed in the proper traditional way.'*

Cosia Masolo, evicted village elder and father of 20 now living on a 0.3 hectare piece of land in Mabembe, Buwabwala sub-county

Can't Tree Farms provide jobs for local people to do?

Tree Farms originally employed several hundred people to manage the Bukaleba plantations. In 2000, however, only 43 were left, according to the assistant administrator at the company's forest station, with only 20 working on the plantations themselves.

Tree Farms did allow farmers to grow maize, beans, and other products between the rows of planted trees during the first few years, until the trees grew too high for other plant life to grow beneath them. According to an EU-supported study, however, this scheme 'resembles a Middle Age feudal system but without the mandatory "noblesse oblige" and with the farmers paying for the bulk of the investment cost of the plantation establishment'.[29] Local farmers clear, plough, weed and manage the plantation areas, providing free labour for ground clearing and weeding.[30] Many farmers reported having to pay the firm cash or a share of their crop to be allowed to farm on the company's lands. One extended family with five adults working on one acre told NorWatch that the previous year they had had to pay 100 kilograms of maize to Tree Farms out of a harvest totalling 250 kilograms.[31]

Conflicts over land and unpaid labour were seen by several locals as threatening the project's future as a provider of both wood and carbon credits. Farmers have reportedly over-pruned trees, uprooted seedlings, and neglected weeding in efforts at surreptitious sabotage.[32] The Ugandan forest authorities, meanwhile, reprimanded Tree

Farms for low technical standards and demanded that the company 'do some real investment to produce quality tree stands'.[33]

The eucalyptus plantations have also suffered termite attacks. By 2001, the Tree Farms project was way behind schedule and suffering from lack of funds. To raise some quick money, the company was even forced to clear 50 hectares for commercial maize crops, arousing further criticism from the forestry authorities.

But is the project at least storing some carbon?

Tree Farms' original management plan called for their plantations in the Bukaleba reserve to cover some 4,260 hectares of the company's total area of 5,160 hectares by 2005. The firm anticipated being able to sell 500 tonnes of CO_2 credits per hectare, or 2.13 million tonnes of carbon dioxide in all.[34] The accounting that resulted in this figure was wildly optimistic.

For one thing, proper carbon accounting for the project would require following around thousands of evictees, many of whom would probably have to clear land elsewhere, resulting in carbon emissions attributable to Tree Farms. This would be impossible, particularly in a country such as Uganda, where poverty, landlessness, and political instability keep people constantly moving from one end of the country to the other.

For another, advance sale of carbon credits would require that the long-term political future of Bukaleba be known in advance, so that any re-invasion of the area could be predicted and its effects on carbon storage precisely quantified and insured against or compensated for. No basis exists for deriving numbers of this sort.

The future investment climate for such projects would also have to be calculated, as well as the probability of fires; the ecological effects of plantations on local patches of native vegetation through hydrological or other changes; the soil carbon loss attributable to clearing, ploughing and erosion caused by the project.[35] Even to attempt to do all this would drive the costs of the project through the roof.

If the original easy numbers posited by Tree Farms were accepted by the market, however, they would translate into carbon profits of the order of USD 10 million, well over a dozen times Tree Farms' outlay on land. This would not include possible income from timber and wood sales. Turning Bukaleba into a Norwegian carbon plantation, moreover, would mean that its lands would not be available for long periods either for agriculture or for plumping up Uganda's own carbon accounts.

'The Money Came from a Place Far Away': Tanzanian Land, Norwegian Carbon

In addition to its project in Uganda (see main text), Norway's Tree Farms company was also, by 2000, trying to acquire savannah land totalling over 70,000 hectares in Tanzania. Between 1996 and 2000, some 1,900 hectares of trees were planted in Mufindi and Kilombero districts at about 2,000 metres above sea level, where a seasonally moist climate provided lots of water for thirsty industrial monocultures of *Pinus patula* and *Eucalyptus saligna*.

The land had been leased from the government at USD 1.90 per hectare per year for a 99-year period on condition that it be used solely for forestry. Industrikraft Midt-Norge, the Norwegian power utility, meanwhile signed an options contract to pay Tree Farms nearly USD 4.50 per tonne of carbon dioxide supposedly sequestered. Over a 25-year period, this would give Tree Farms a carbon profit of about USD 27 million for one plantation complex, Uchindile, compared to USD 565,000 paid to the Tanzanian government in compensation for losing the opportunity to do anything else with the land.

Yet according to Tree Farms Managing Director Odd Ivar Løvhaugen, the firm would have invested in Tanzania's forestry sector regardless of possible carbon money. Løvhaugen emphasised that the company considers any trade in carbon credits merely as a supplement to those from conventional forestry. The Tree Farms carbon project would thus be in breach of the requirements for carbon projects outlined by the Kyoto Protocol, which disallow credits from activities that would have been undertaken without special carbon finance.

Promising various social benefits, the company had succeeded in overcoming villagers' reluctance to cede their uncultivated land to the project, but in the end pledges to provide health and education services were not kept. Up to 500 local villagers were hired to plant and nurse the trees, build roads, or watch over the plantations. But planting took place only between December and March, so the work could not replace agricultural or animal husbandry occupations. In addition, the promised wage was too low – USD 1 a day, less than the government's recommended minimum – for anything other than daily subsistence. Many workers were not paid at all. Some workers interviewed by NorWatch in 2000 had eight months of wages owing to them.

'When we asked about the salaries', commented the residents of Uchindile village, 'the company told us that the money came from a place far away and that there was nothing that could be done about it'.

Source: Jorn Stave, NorWatch/The Future in Our Hands, 'Carbon Upsets: Norwegian "Carbon Plantations" in Tanzania', in Friends of the Earth, *Tree Trouble*, Friends of the Earth, Asuncion, 2000.

In sum, the project was not just a 'lose-lose' initiative for forestry and local people, as concluded by the EU-funded study,[36] but in fact a 'lose-lose-lose' state of affairs. The forestry effects of the scheme were

unhealthy, local villagers were suffering, and, as Trygve Refsdal, advisor to the Ugandan forest authorities, warned, Uganda was in danger of being subjected to a 'new form of colonialism':

> Forest-planting in Uganda and other poor countries must, firstly, aim to meet the needs of the country and the local people, not the needs of the "international community." If these can be combined, it's OK, but experience from similar initiatives show that local interests, local needs, and traditional land rights are easily pushed aside, and that land conflicts arise when outside commercial interests enter.[37]

Growing international criticism ultimately prevented Tree Farms from claiming carbon credits for the project. But trees continued to be planted. After lengthy negotiations, the Norwegian owners conceded a little under 5 per cent of the land they had leased from the government to local people, but locals complained that they were still paid badly and that most of the labour was not sourced locally.

But perhaps the Tree Farms experience will lead to less exploitative arrangements in the future.

'The biggest problem is how to secure food for the family. All our gardens, where we used to get food, have been taken over by the park rangers'.

Amina Gidongo, widow and mother of seven children living in a cave as a result of having been evicted

Sadly, the evidence suggests otherwise. The international carbon economy has since played a big part in stimulating land grabs by private developers in Uganda's state forests. In 2003, several officials of the Ugandan government, including not only former vice-president Dr Specioza Kazimbwe but also officials familiar with the international climate negotiations, received large concessions for land suitable for afforestation and reforestation, while communities applying for concessions were left empty-handed and may be excluded from access to the forests in the future.

In addition, a carbon project of the Uganda Wildlife Authority (UWA) and The Netherlands's FACE Foundation[38] to plant trees in a national park has contributed to a raft of social and environmental problems.

Not again!

I'm afraid so. The idea sounded innocent enough: to plant mainly native trees in encroached-upon areas inside and along the 211-kilometre-long boundary of Mount Elgon national park near the Kenyan border. In 1994, FACE undertook planting of 25,000 hectares and in return was given rights over the carbon supposedly sequestered – expected to amount to 2.11 million tonnes of CO_2 over 100 years.[39] UWA's role was to manage the plantations, protecting biodiversity, safeguard park borders and so on. In 2002, certifiers for the Societé Générale de Surveillance (SGS) found that a bit over 7,000 hectares had been planted.

As documented by Timothy Byakola of the Ugandan NGO Climate and Development Initiatives, no one denies that the project has had some good effects. It is acknowledged by locals as having improved regeneration on the boundaries of the park, particularly in areas that had been badly encroached on by agriculture, and as having increased streamflow from the forest. In 2003, the UWA-FACE project was even certified by SGS as a well-managed forest according to Forest Stewardship Council (FSC) principles (for more on the FSC, see 'From The Netherlands to the Andes – A tale from Ecuador' on page 247 and 'Brazil – Handouts for repression as usual' on page 302).

But according to local council officials, the project employs few people, and even then only during the planting period. And the evictions have made many homeless and hungry. In 2002, for instance, 300 families were evicted from disputed land by park rangers in Wanale, Mbale district. Complaining that they had lived on the land for 40 years, with some even holding government land titles, the families said that they were forced to seek refuge in neighbouring villages where they now live in caves and mosques. Fires have to be kept burning the whole night in the caves to protect against cold, and school-going children have had their studies disrupted. Dodging armed ranger patrols, children slip back to their families' former gardens to steal what they regard as their own food. Local people have lodged a case seeking compensation for destroyed property and the return of their land with the Mbale district court.

Hundreds of families have also been evicted in other locations, increasing social tensions.[40] In 2003, villagers disgruntled at UWA's militarised approach destroyed over 400 hectares of eucalyptus plantations in one night. In February 2004, *New Vision* newspaper reported that police were holding 45 people 'suspected of encroaching on Mount Elgon national park and destroying 1,700 trees' planted by the UWA-FACE Foundation project.[41] At a November 2004 community meeting held in Luwa trading center, Buwabwala sub-county, evicted locals insisted that they would go back to the forest rather than face starvation. The park warden, for his part, promised that anyone caught in the forest would be shot.

'The boundaries were made unilaterally, displacing over 10,000 people. The wildlife people who operate the park are very militarised, and have killed over 50 people. People feel that the government favours animals more then the people.'

David Wakikona, Member of Parliament, Manjiya[42]

In fact, so tense has the atmosphere become that Members of Parliament from eastern Uganda have appealed to the government to degazette Mt Elgon's boundaries to ease the suffering.

But maybe a little short-term pain was necessary in order to preserve the forest and its carbon.

But what else gets destroyed in the process? It's not just a matter of

Recent carbon forestry initiatives in Uganda have been researched by Timothy Byakola of the Ugandan NGO Climate and Development Initiatives.

temporary social dislocation, but also farmland shortages, environmental damage outside the park, and disrupted relationships between local people and the forest.

Today, with a population density of over 450 people per square kilometre in the farmlands around Mbale town and 250 per square kilometre in Kapchorwa district, the village areas bordering Mount Elgon national park are the most densely populated in Uganda, partly due to UWA evictions. Communities living close to the forest mainly grow food crops such as bananas, yams, sweet potatoes and vegetables at bare subsistence levels with few surpluses remaining for sale in local markets. Production of a few cash crops such as coffee and wheat is fast dwindling due to fragmentation of land. A typical peasant holding in the area averages between 0.25 and 1.0 hectares, with a household having an average of 10–15 members.

One result is that soils are quickly losing fertility. Most trees and other vegetation in the villages outside the park have been cut to provide fuelwood for cooking and building materials, leaving open denuded slopes. Deforestation has left land open to erosion as more areas are being converted to agriculture. In 1996, a one-kilometre landslide killed nine people in Budesi and Buwali parish, and during the heavy rains of the 1997 El Niño, another five by landslides in Bunabokha village in Budesi parish. Many locals are concerned that rivers flowing from the mountain are now carrying higher sediment loads, especially during rainy seasons. Communities and community development organisations note that fisheries have suffered.

All this is due to there being too many people. That's not UWA-FACE's fault.

It's not so simple. Land scarcity in the area is partly a result of the 'encroachment' of the national park on longstanding farmland, and the hand of the eviction authorities has unquestionably been strengthened by the project.

Social networks have also been endangered when UWA cuts off villagers' access to intact forest and its animals, bamboo shoots, firewood, mushrooms, vegetables, herbs, medicines, building materials, and wood used in circumcision ceremonies. In Bubita sub-county, council officials reported that firewood is now hard to find and that people have resorted to using banana leaves to prepare food, meaning they can no longer eat foods that require long cooking, such as beans. Goats and cows have to eat banana stems because the forest where they used to graze on grass is now a no-go area. In Buwabwala, many young girls are crossing over to neighbouring Kenya to earn money to buy land for their parents. Some have moved into prostitution and contracted HIV.

But hasn't the project improved the economy of the region?

Locals indignantly reject FACE Foundation claims that the project has increased incomes, improved standards of living work, provided jobs in planting and nurseries, and given out seedlings for villagers to plant on their farms.

A Funny Place to Store Carbon: Land Disputes at Mount Elgon

Mount Elgon was first gazetted as a Crown Forest in 1938 and became a central forest reserve in 1968 and a national park in 1993. But the area has a long history of human occupation and use. Already in the 1930s, many families were living within the boundary, with about 70 heritable licences issued to families living and cultivating the forest reserve. In 1954, when the first working plan for Mount Elgon forest reserve was written, there were still around 30 licensed families living there.

Forest boundaries were originally marked by holes. In 1962, the forest was resurveyed and live boundary markers, including trees of exotic species, were put in place. However, the boundaries were not plotted on the national land grid, making it hard later on to establish where they had been when the markers were destroyed.

Between 1970 and 1985, during an era of breakdown of law and order, high levels of industrial timber exploitation and confused forest policy, some 25,000 hectares of prime high montane forest between 2000 and 3000 metres in altitude were destroyed or degraded through clearing for agricultural activities. Pit-sawing combined with swidden cultivation reduced the densely-forested lower slopes to barer landscapes colonised by Kikuyu grass (*Pennisetum clandestinum*).[43]

In 1993, Mount Elgon was designated as a national park. But local people were not consulted, in violation of the law. Families found inside the 1963 boundaries – some of whom had occupied the land for over 40 years – were given nine days to vacate, despite the understanding among many of them that the land was theirs and that such arbitrary evictions are in breach of land laws as well as the subsequent 1995 Constitution, which recognises customary ownership.

In August 2003, the Uganda Land Alliance started proceedings against the Attorney General and the UWA on behalf of the Benet people (also known as Ndorobo), who are indigenous to Mount Elgon. The Benet, who had been evicted in both 1983 and 1993, had decided to take the government to court to claim their land rights, and accused the UWA of harassment. The government cut off education and health services to the area and forbade local people from working the land. In October 2005, however, Justice J.B. Katutsi ruled that the Benet people 'are historical and indigenous inhabitants of the said areas which were declared a Wildlife Protected Area or National Park'. Katutsi ruled that the area should be de-gazetted and that the Benet should be allowed to live on and continue farming their land.[44]

Costa Rica – 'Environmental services' pioneer

Costa Rica has always been one of the countries in Latin America keenest to host carbon forestry projects and other 'environmental services' market schemes. In the mid-1990s, looking for new ways to derive value from its forests, it decided to become the first country to bring its own government-backed and -certified carbon forestry credits into the global market,[45] and even before Kyoto was signed was selling them to the Norwegian government and Norwegian and US corporations.

To work on the scheme, Costa Rica hired Pedro Moura-Costa, a Brazilian forester with experience in early Malaysian carbon forestry projects backed by New England Power of the US and The Netherlands' FACE (see 'From The Netherlands to the Andes – A tale from Ecuador' and 'The story continues – Carbon forestry in Uganda'). Moura-Costa in turn convinced Societé Générale de Surveillance (SGS), one the world's leading testing, inspection and certification companies, to use Costa Rica as a test site for learning how to make money as a carbon credit certifier. On the back of his own experience, Moura-Costa then set up a new carbon consultancy, EcoSecurities.

Also significant was an early Costa Rican project called CARFIX, implemented by the voluntary organisation Fundación para el Desarrollo de la Cordillera Volcanica Central and funded by US Aid for International Development (USAID), the Global Environmental Facility and Norwegian financiers. CARFIX earned its North American sponsors carbon credits by promoting 'sustainable logging' and tree plantations on 'grazed or degraded lands', claiming to provide local people with income they would otherwise have to earn through export agriculture and cattle production that endangers forests.[46] Following the emergence of the Kyoto Protocol in 1997, Costa Rica pushed for the certification techniques it had pioneered to be adopted around the globe, and signed further carbon deals with Switzerland and Finland.

Costa Rica's enthusiasm for carbon offset projects seems to suggest that there are a lot of benefits in this market for the South, after all.

The enthusiasm is not unanimous, even in Costa Rica. In fact, the boom in carbon forestry fits into an existing trend of support for monoculture tree plantations that has aroused concern among local environmentalists. Between 1960 and 1985, about 60 per cent of Costa Rica's forests disappeared due to cattle farming. Then there was a 'wood shortage' scare, and the government subsidised monoculture tree plantations extensively between 1980 and 1996. Helped by government incentives, over 130,000 hectares have been covered by the plantations over the past 20 years. By 2000, plantation monocultures covered over 3 per cent of Costa Rica's territory.

A typical ecosystem on which a Costa Rican plantation might be established. The carbon released from the standing trees, removed to make way for the plantation, often will not appear in project accounts.

The Clean Development Mechanism (CDM), Costa Rican environmentalists fear, may help spread the monocultures even further. In the late 1990s, a government official active in the climate negotiations helped promote a new law supporting monocultures. Half of a 3.5 per cent fuel tax went into an 'environmental service programme' designed largely to give incentives to private landowners to be 'green' in a country in which 20 per cent of the land is national parks, a few per cent indigenous territories and the rest private land. Under the programme, a landowner might get, for example, USD 90 per hectare per year to conserve forest, or USD 500 per hectare over five years to establish a plantation. In return, the state gets rights to the carbon in the plantation, which it can use to bargain with in international negotiations.

How much of this tax money goes to forest conservation, and how much to plantations?

Most payments under the environmental services programme go to forest conservation, but 20 per cent is used to subsidise monoculture plantations and agroforestry. This has provoked objections from ecologists, academics and indigenous peoples who argue that monoculture plantations, often lucrative in themselves, can damage the soils, water and biodiversity that the programme is supposed to protect. The programme may also soon be supported by a tax on water and electricity.

Still, 20 per cent is a pretty small proportion, isn't it?

Overall, Costa Rica is today putting USD 1.5 million annually into financing 4,000–6,000 hectares per year of new plantations. That may not seem much, but Costa Rica's total territory is only a bit over 5 million hectares. A UN Food and Agriculture Organization consultant's study has suggested that the country set up even more plantations, up to 15,000 hectares per year, using carbon money. Another study estimates that, during the period 2003–2012, some 61,000 hectares of monoculture plantations, or 7,600 a year, could be established in so-called 'Kyoto areas'. That's well above the current rate,[47]

implying that plantations could start competing aggressively for land that might otherwise be given over to secondary regeneration and conservation of native forest.

In addition, because CDM forestry projects, for economic reasons, would probably have to cover 1000 hectares and upwards (see below), they could well threaten the land tenure of people carrying out other forest projects in Costa Rica. The average landholding in the country is less than 50 hectares, with most parcels belonging to families.

Well, sacrifices do have to be made for the climate, don't they?

Ironically, one of the things that the Costa Rican case helps show is the impossibility of determining whether the climate would in fact benefit from a policy of pushing such projects. It also clarifies the problems of fulfilling the conditions set out in the Kyoto Protocol[48] for reforestation and forestation carbon projects.

Take, for example, a study on carbon projects done by the Forest and Climatic Change Project (FCCP) in Central America, jointly executed by the Food and Agriculture Organization of the UN and the Central American Environmental and Development Commission (CCAD).[49] The study shows that available soil use maps are not precise enough to show how carbon storage in prospective carbon sink areas (or 'Kyoto areas') has changed since the 1990s, and are also hard to compare with each other. That would make accounting for increased carbon storage over the period impossible.

The study also suggests that it would be impossible to show to what extent Kyoto carbon projects were additional to 'those that the country implements as part of its forestry development projects': 'it is not possible to predict in what exact proportion these activities will be in or out of the Kyoto areas and any assumption in this respect is enormously uncertain'. In addition, Kyoto carbon projects could find it hard to factor out the anthropogenic activities to encourage natural seed nurseries that are being promoted and funded without carbon finance.

Above all, the FCCP study reveals the conflict between convenience and accuracy in measuring carbon. Measurements of soil carbon before and after the start of any carbon forestry project, it says, would be too costly, even though such measurements are a key to carbon accounting for plantations, which disturb soil processes considerably.[50] Similarly, the study accepts for convenience a blanket carbon storage figure of 10 tonne per hectare for grassland sites that could be converted to carbon forestry. However, Costa Rica boasts too wide a variety of grasslands and agricultural systems – most of them comprising a lot of trees – for such a figure to be used everywhere.[51]

But can't you cover such unknowns just by taking the amount of carbon you think you might be sequestering and reducing the figure by a certain percentage, just to be on the safe side?

That's what many carbon accountants do. The FCCP study, for example, suggests a 20 per cent deduction from the figure designating total potential of carbon sequestered to compensate for political and social risks and a 10 per cent deduction to compensate for technical forestry risks.

A 12-year-old plantation of *Terminalia* trees. The carbon released from eroded soils, such as appear in the photograph, is often missing in project accounts.

The problem with such 'risk-discounted' figures is that carbon sequestration is characterised by far more than just risk (see Chapter 3). Uncertainty and scientific unknowns are other realities that biological carbon accounting has to cope with.[53] In these conditions, it's impossible to be sure whether any particular numerical risk factor is conservative enough to compensate for the unknowns involved.

In Costa Rica, for instance, most monoculture tree plantations are less than 20 years old, with a trend towards planting just two species – *Gmelina arborea* and *Tectona grandis*. Pest or disease epidemics can therefore be expected, but their extent is incalculable. Furthermore, El Niño climate events may propagate enormous fires whose extent, again, cannot be calculated in advance. During the dry season of 1998, in the humid tropical zone where uncontrollable fires had never been reported before, over 200,000 hectares were burned. Part of this territory is under monoculture tree plantations. Given such realities, it's unsurprising that the FCCP carbon project study could give no reasons for its 'technical' risk figure of 10 per cent.

At present, there is also little basis for guessing how much carbon sequestered in Costa Rican trees will re-enter the atmosphere and when. The FCCP study simply assumes that 50 per cent of the carbon sequestered by a given project will remain so once the timber has been sold and used. However, the most common plantation species in the country (*Gmelina arborea*) is logged at least once every 12 years and most of the timber is used to manufacture pallets to transport bananas. The pallets are thrown away the same year they are made and probably store carbon no longer than a few years – though no one has done the empirical studies necessary to be sure.

The FCCP study also assumes that anthropogenic activities to foster natural seed nurseries will result in secondary forests that will be in place for at least 50 years. Accordingly, they make no deductions for re-emission of carbon. However, although current forestry law prohibits transforming forests into grasslands, both legal changes and illegal use could result in large re-emissions whose size would be impossible to determine in advance.

Fossil Carbon vs. Tree Carbon: Two Environmental Historians Speak

'Carbon cannot be sequestered like bullion. Biological preserves are not a kind of Fort Knox for carbon. Living systems store that carbon, and those terrestrial biotas demand a fire tithe. That tithe can be given voluntarily or it will be extracted by force. Taking the carbon exhumed by industrial combustion from the geologic past and stacking it into overripe living woodpiles is an approach of questionable wisdom... Eliminate fire and you can build up, for a while, carbon stocks, but at probable damage to the ecosystem upon the health of which the future regulation of carbon in the biosphere depends. Stockpile biomass carbon, whether in Yellowstone National Park or in a Chilean eucalyptus plantation, and you also stockpile fuel, the combustion equivalent of burying toxic waste. Refuse to tend the domestic fire and the feral fire will return – as it recently did in Yellowstone and Brazil's Parc Nacional das Emas, where years of fire exclusion ended with a lightning strike that seared 85 per cent of the park in one fiery flash.'[54]

Stephen J. Pyne,
Arizona State University

'Undeniably, having more trees will work in the right direction – but to a minute degree. For its practical effect [on climate change], telling people to plant trees is like telling them to drink more water to keep down rising sea-levels.'[55]

Oliver Rackham,
Cambridge University

To try to overcome such problems, the Global Change Group of the Tropical Agronomic Centre for Research and Teaching (CATIE), has been studying ways of putting non-permanent biological carbon in the same account as fossil carbon emissions, so that the two can be added and subtracted.[56]

One proposal is called 'tonne-year' accounting. The first step in tonne-year accounting is to determine the period that a tonne of carbon has to be sequestered in order to have the same environmental effect as not emitting a tonne of carbon. Because the lifetime of greenhouse gases in the atmosphere is limited, this time period should be finite. If the 'equivalence factor' is set at 100 years, then one tonne of carbon kept in a tree for 100 years and then released to the atmosphere is assumed to have the same environmental effect as reducing carbon emissions from a fossil-fuelled power plant by one tonne.

The second step is to multiply the carbon stored over a particular year or decade by the complement of this equivalence factor to find out what the climatic benefits are of that project for that year, and to limit the carbon credits generated accordingly. So the forestry project doesn't have to be permanent to generate carbon credits; it will just generate fewer credits the more short-lived it is.

Trust Me, I'm a Doctor: Three Professionals on How to Measure Carbon Offsets

'…I've often asked myself, when I've been flying in an aircraft, and I've flown over complex landscapes…how the hell can you measure carbon down there to a few per cent? The people that measure the carbon, either by satellite measurements or by flux towers, or by, sort of, sort of looking at the forest…all claim that within some reasonable degree of accuracy or precision you can do it. But when I look down on a complex landscape, I have to be honest, it's…um…I get very impressed if these guys are indeed correct. But, hey, the fact that when I look down in an aircraft and I think its going to be complicated, that's my gut instinct versus the scientific community's. And they claim they can demonstrate what precision and accuracy they can get… One has to go with what these scientists are saying.'[57]

Dr Robert T. Watson, Ex-Chairman, Intergovernmental Panel on Climate Change, interview with Cathy Fogel, Washington DC, 6 October 2001

'If you know that saving the Amazon is better for the atmosphere than keeping one car off the road, then you ought to be able to calculate how many cars are equivalent to saving the Amazon. The calculations may be difficult, but I don't see why the problems should be insurmountable.'[58]

Dr Richard Tipper, Edinburgh Centre for Carbon Management

'Baselines are not a question of imagination. At the International Centre for Research in Agroforestry, we have developed a method for monitoring and evaluation of environmental and development projects that involves project baseline measurement for any response variable that one deems important (e.g. household income, adoption of improved farming technologies, etc.). This same method could easily be used for carbon accounting and take the guesswork out of 'without-project' baselines, additionality and leakage. The simple solution to a problem that has been overcomplicated in the debate is: just measure it! It is really not that hard. Environmental monitoring is a mature field and rigorous methods exist for attributing project impact.'[59]

Dr Louis Verchot, Lead Scientist for Climate Change, International Centre for Research in Agroforestry

You still haven't mentioned any problems.

The first problem is that you still have to measure the carbon stored by a project over a particular year or decade. That runs into the same problems with ignorance, uncertainty and all the rest mentioned above. Second, no one knows how long the 'equivalence time' should be. Figures ranging all the way from 42 to 150 years have been mentioned.[60] Another difficulty is that even if one settles on a figure of,

A new teak plantation near the San Carlos River in northern Costa Rica. Exposed soil heated by direct tropical sunlight is likely to release significant quantities of carbon.

say, 100 years, it does not necessarily follow that carbon sequestered for 10 years will have one-tenth the climatic effect of carbon sequestered for 100 years. Again, the problem is not that any given patch of trees is temporary, but that there's so much uncertainty and ignorance about how to measure its relevance to climate. It's not a matter of calculable 'risk', but something far more recalcitrant to market accounting.

In addition, tonne-year accounting can make what allowances it does make for uncertainty only at the cost of generating carbon credits slowly. That makes it unattractive to business. It also militates against small projects. The CATIE study found that at prices of USD 18 per tonne – more than actual prices as of 2006 – the tonne-year methodology would allow profits only in projects of over 40,000 hectares.

Then there is a method called 'average storage adjusted for equivalence time' (ASC), which generates credits more quickly.

A Costa Rican acacia plantation. The logs in the foreground have been discarded and left to rot. In a few years, they will release all their carbon back to the atmosphere.

Other methods include the UN's 'temporary' Certified Emissions Reductions (tCERs), which expire at the end of the Kyoto Protocol's second commitment period and must be replaced if retired for compliance in the first commitment period; and 'long-term' credits (lCER)s, which expire and must be replaced if the afforestation or reforestation project is reversed or fails to be verified. None of these approaches, however, address the basic problems of uncertainty and ignorance described in Chapter 3. In fact, not even the atmospheric lifetime of carbon dioxide emissions can be pinned down with any precision, as mentioned above. For business, this translates into accounting headaches and high economic risk.

In the end, CATIE came to the conclusion that CDM forestry projects had to be big in order for it to be worthwhile to fulfil all the accounting and other requirements. Out of a total of over 1,500 simulated scenarios, only 8 per cent made it possible for projects under 500 hectares to participate. The mean size of a profitable project was 5,000 hectares. One way out would be to bundle smaller projects together and employ standardised assumptions and procedures, but again that would magnify accounting mistakes and also would be hard to achieve, given the Costa Rican land tenure system.

You've talked a lot about how much harder it is to measure how much carbon is sequestered in tree projects than simply to keep fossil carbon in the ground. But maybe we don't need to compare carbon sequestered in trees with carbon stored in fossil deposits. We should think of forestry carbon projects like Costa Rica's as replacing carbon released from forests, not as replacing carbon released from fossil fuel combustion. This should solve the measurement problem, since all we have to do is compare biotic carbon with other biotic carbon.

No, the same problems hold: how do you quantify carbon savings against an unspecifiable baseline, given the biological and social unknowns governing carbon flows in the above-ground systems? (See Chapter 3.)

Yes, climate change can be addressed by trying to conserve forests just as it can be addressed by keeping fossil fuels in the ground. But it can't be verifiably addressed by burning forests and then 'compensating' for this burning with biotic projects, any more than it can be verifiably addressed by mining fossil fuels and then 'compensating' for the associated carbon transfer to the biosphere with biotic projects.

Research for the section on Costa Rica was done by Javier Baltodano of Friends of the Earth, Costa Rica.

What's the future for Costa Rican carbon forestry projects?

The government has recently declared that it will put more effort into non-forestry projects such as windmills and hydroelectric schemes, on the grounds that they are less complicated and yield higher-priced carbon credits. On the other hand, companies such as the US-based Rainforest Credits Foundation[61] continue to be eager to set up new carbon schemes in Costa Rica, often without much prior consultation with the government.

India – A taste of the future

If countries in Latin America pioneered carbon projects, one of the countries to attract the most long-term interest among carbon traders and investors has been India.

By August 2006, the country led all others in number of CDM projects registered with 82, followed by Brazil with 58.[62] Many more are in the pipeline.[63] The Indian government is also pressing for nuclear power and large hydroelectric dams to be allowed to receive CDM funding, and, according to some observers, hopes to use carbon money for developments in the country's Northeast that would dispossess local people of water, land and forests.[64]

With about 350 projects at various stages of registration, the poten-

tial for non-plantation CDM projects is estimated by one source at more than 170 million tonnes of carbon dioxide equivalent per year, including 90 million tonnes from renewable energy schemes, while the potential yield of land-use and plantation projects is put at about 78 million tonnes of carbon dioxide equivalent annually.[65] A CDM National Strategy Study predicts that India could take 10-15 percent of the global CDM market.

As social activist Soumitra Ghosh and researcher Hadida Yasmin explain, a 'friendly and indulgent' national CDM authority which 'clears CDM projects in India almost as soon as they are submitted', a ' "clean" and aggressive corporate sector', and a 'happy band of new-age national as well as transnational validators, consultants and project developers have made India a veritable paradise for CDM projects.'[66] News about CDM projects and the income they will supposedly generate is boosting stock prices in even some of the worst-polluting sectors, such as sponge iron (see below). Accordingly, many of the big names of the Indian corporate world – Reliance, Tata, Birla, Ambuja, ITC – are moving in, in spite of earlier apprehensions that market uncertainty and the complex procedures that CDM involves would put off big companies.

Some of these firms are coming up with smaller-scale projects in renewable energy and energy efficiency. At an ITC paper and pulp operation in Andhra Pradesh, for instance, six separate CDM projects are being arranged inside the same factory. Bundled hydro and wind projects—and biomass—are also industry favourites due to a less risky registration procedure. However, nearly 85 per cent of Indian carbon credits are being generated by only two projects. Both projects – set up by blue-chip corporations SRF in Rajasthan and GFL in Gujarat – destroy HFCs, which are extremely powerful greenhouse gases used in refrigeration, air conditioning, and industrial processes.[67]

Inevitably, social activists are raising questions about whether such one-off gas destruction projects provide 'any credible sustainable development' to local communities.[68]

Why shouldn't such projects be beneficial to local communities?

First, because HFCs are so bad for the climate, projects that destroy them can generate huge numbers of lucrative credits merely by bolting a bit of extra machinery onto a single existing industrial plant. As a result, there are no knock-on social benefits other than providing income for the machinery manufacturer and some experience for a few technicians. Second, such projects don't help society become less dependent on fossil fuels. They don't advance renewable energy

sources, and they don't help societies organise themselves in ways that require less coal, oil or gas. Third, by ensuring that the market for credits from carbon projects is dominated by large industrial firms, they make it that much more difficult for renewable energy or efficiency projects to get a foothold.

Don't such projects also provide perverse incentives for governments not to do anything about pollution except through the carbon market? If I were a government trying to help the industries in my country get masses of carbon credits from destroying a few HFCs, I would hesitate to pass laws to clean up HFCs. Such laws wouldn't make industry any money. In fact, they would cost industry. Instead, why not just allow the pollution to go on until someone comes along offering money if it is cleaned up?[69]

That's a question that's understandably going through the minds of government officials in many Southern countries (as well as of those of corporate executives in the North). As a result, it's not clear whether the CDM market is actually a force for less pollution or not.

Another danger is that HFC projects could undermine the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer. While this Protocol mandates phasing out of HFCs in Southern countries by 2010, the CDM has now provided a perverse incentive to hike production of HFCs in order to cash in as much as possible on credit sales. Although the CDM board has raised the issue with governments, no decision has been made to limit the number of HFC credits or bar new plants from entering the CDM market.

But at least HFC projects don't do any harm to local people, right?

That's a matter of opinion. If the industry getting the credits is hurting local people, local people may well disagree with the project. Near Gujarat, at Fluorochemicals Limited, proprietor of one of India's first projects to be registered with the CDM, villagers complain of air pollution's effects on their crops, especially during the rainy season, and believe the plant's 'solar oxidation pond' adds to local water pollution.[72]

Villagers near another factory hoping to benefit from CDM credits, Rajasthan's SRF Fluorochemicals, believe that their aquifers are being depleted and their groundwater polluted, leading to allergies, rashes, crop failure, and a lack of safe drinking water.

What about other industrial projects?

One of the industries that is benefiting most from the CDM is the notoriously dirty sponge iron sector.

The Fate of Small Projects

The CDM's market structure biases it against small community-based projects, which tend not to be able to afford the high transaction costs necessary for each scheme (see Chapter 3). In India, for example, the Barefoot College has trained 20 – 30 solar engineers, who have installed grid solar power stations and solar lanterns across the country. Such projects 'have difficulty accessing CDM finance,' according to Bunker Roy of the College, due to the need for 'upfront financing' and 'bundling' projects together to save on transaction costs.[70]

Another project, the FaL-G Brick Project, aims to promote fly ash bricks as an alternative to burnt clay bricks in the Indian construction sector. Fly ash, a waste product from thermal power plants, is mixed with lime from the acetylene industry and gypsum from chemical plants to form a material for making bricks that requires less fossil energy than conventional materials.

The process is unsustainable in that it relies on a fossil fuel-intensive industry, whose lifespan it would extend through sales of carbon credits. In addition, fly ash poses a health hazard to the workers who handle it. The project thus adds to the numbers of people suffering health risks due to fossil fuels in two ways: by prolonging fossil fuel pollution around thermal power plants buying the credits, and by bringing a new group into contact with hazardous fly ash.

The FaL-G project would ordinarily be subject to the same market handicap as small solar projects, since the brickmakers to be included tend to be small operations and the 'volume of emission rights generated by an individual plant is clearly not sufficient to treat an individual plant as a separate small-scale CDM project'. The World Bank's Community Development Carbon Fund, however, has stepped in to make it possible to 'bundle' together hundreds of these tiny plants – located in states as distant from each other as Tamil Nadu, Karnataka, Orissa, Uttar Pradesh and Punjab – under a single project umbrella, streamlining costs.[71]

What's sponge iron?

Sponge iron is an impure form of the metal obtained from removing the oxygen from iron ore. Its manufacture requires a lot of water and energy supplied by gas or, more frequently, coal.

In what ways is it environmentally damaging?

In Chhattisgarh state, the most polluted in the country, sponge iron factories have contaminated drinking water and, by lifting huge quantities of water from rivers and irrigation canals, lowered water tables.[73] Sponge iron works, which are subsidized by the state, also cause heavy air pollution, often in breach of pollution control norms, affecting health and agriculture. As of 2005, 33 out of 48 sponge iron units in Chhatisgarh were operating without having obtained statutory clear-

ances from the state's Pollution Control Board.[74] According to a report of the State Pollution Control Authority, 36 of the units are in violation of environmental pollution laws. In Siltara area of Raipur district, land near 18 sponge iron units has become barren.[75] Government soil tests from 30 separate sites in various villages found the soil to be contaminated with iron, affecting crop yields. Stored paddy seeds fail to regenerate, and even 50 kilometres away, production has suffered. Vegetables grown in the area turn reddish due to excessive air pollution.

In the last eight years alone, 17,200 hectares were acquired for industrial purposes in the state, displacing many villagers. Entrepreneurs typically acquire their first parcel of land through official channels such as the State Industrial Development Corporation, which in turn acquires its holdings from private owners at below market rates. The entrepreneurs are then are able to buy adjoining parcels at bargain prices after the pollution from their factories renders them useless for farming. Sellers are often left with few resources to restart their lives elsewhere, and are seldom able to find employment at the factories. And many new plants are contemplated or under construction.

The internet face of Jindal Steel and Power. The reality is quite different.

It sounds like there are some serious problems with this industry. But that's a good argument for CDM involvement, isn't it? Isn't it the function of CDM to help clean things up?

Is the CDM helping to clean the industry up, or is it providing new finance and a pleasant image for a socially and environmentally damaging status quo? Let's look at the evidence.

Start with the biggest sponge iron operator, Jindal Steel and Power Ltd. (JSPL). JSPL runs what it claims to be the largest sponge iron plant in the world near Raigarh city, where it is developing not one but four separate CDM projects that have already been approved by India's government and validated. JSPL's carbon projects are likely to

make it one of the largest energy CDM operations anywhere in the world, generating many millions of tonnes of so-called carbon dioxide 'reductions'. Spread over 320 hectares, the plant has simply wiped out the once flourishing agricultural village of Patrapali, which it still gives as its address.

Concerned citizens and a voluntary organization have filed a case against JSPL in the state High Court over a proposed expansion of its existing facilities. City dwellers object to increasing air and water pollution and ill health. Rural dwellers are angry at losing their lands. JSPL's plans include a 20-billion-rupee expansion over three surrounding villages which, with a population of close to 3000, are located on fringe of mixed deciduous, sal, bamboo, and teak forests. Agriculture is a major occupation, and villagers are also engaged in the collection of non-timber forest produce. In 2005, villagers from 22 communities submitted written resolutions that they did not want to sell or donate their land to industry.

For more than a decade, villagers from 18 communities have also opposed a dam JSPL wants to build on the Kurkut river to cater to its needs for water and power, managing to halt construction when various village heads wrote to the Chief Minister. Having already lost 240 hectares of their revenue land to JSPL, farmers in Khairpur village in Raigarh are meanwhile refusing to surrender any more, and complain about musclemen and touts sent by JSPL to pressure them to capitulate. They are also concerned about a new reservoir JSPL is constructing that would inundate their entire agricultural area (which is irrigated and yields two crops a year) and force them to migrate in search of other work.

Aren't there ways of mediating between the factory and local villagers?

A public hearing on the JSPL expansion – mandated by Indian law – was scheduled for 4 January 2005. But local people's concerns and objections could not be heard, because JSPL brought a large number of supporters and the proceedings were disrupted. The meeting was rescheduled for 18 January 2005 and then 29 January. An alliance of local civil society organizations pointed out that both postponements were made without the statutory 30 days' notice period, and that the Hindi version of the report and executive summary had not been made available. In the event, no actual public hearing was conducted on 29 January, in spite of the fact that more than 10,000 people showed up. Instead, people were asked to queue up to register their complaints and opposition without interacting with the public hearing panel. The environmental impact assessment prepared for the expansion does not properly address the project's impact on local forests

or the dumping of solid wastes and fly ash and the associated heavy metal contamination of water sources. A 'no objection' certificate JSPL claimed to have obtained from the village council of Tamnar for a thermal power plant has meanwhile proved to be a forgery.

But surely JSPL must be an isolated case.

Unfortunately, no. Villagers are also protesting the officially-sanctioned acquisition of 21 hectares by Monnet Steel Industries, another CDM sponge iron beneficiary, in Singhanpur, saying that 'we will die but will not give up our land and homes'. In May 2005, Nalwa Sponge Iron, MSP Steel, Salasar Industries, Shivshakti Factory and Anjani Steels – all CDM beneficiaries – were issued a notice by the local forest officer regarding soot pollution damaging trees and crops. None of the industrial units in the area is following environmental laws of the country and the state, the notice said. All of the firms have seen resolutions passed against their land acquisitions in local village assemblies.[76]

MSP Steel, whose CDM project has already been approved by India's government, has meanwhile illegally occupied reserved forest in the Jamgaon area of Raigadh next to its plant, stirring protests and resolutions from the assemblies of nearby villages. According to a doctor from the Jamgaon Primary Health Center, in the year since the plant went into operation, cases of asthma and other respiratory and gastric diseases have increased 20 times. MSP has also felled trees and started building a factory and road on farmland in Manuapali without proper permission. In March 2005, local villagers blocked a national highway in protest against Monnet's plans to acquire 120 hectares of their land. Villagers have also protested and petitioned against land acquisition by Ind Agro Synergy Ltd., another firm with an already validated CDM project in the works. Many firms are also in breach of the law stating that electrostatic precipitators have to be in operation to curb air pollution.

'There are some local NGOs complaining that the CDM is just there to clean up after the North. But these groups don't go to [United Nations] Conferences of the Parties.'

Ram Babu, PriceWaterhouseCoopers, Mumbai, 2005

But perhaps it's just in Chhattisgarh that the CDM is associated with such operations.

Again, no. In West Bengal, a sponge iron plant run by Jai Balaji Sponge Limited of Kolkata in Ranigunj, Burdwan has a waste heat recovery project set to generate over 400,000 tonnes of carbon dioxide equivalent in credits through the Kyoto Protocol's first commitment period. In 2004, angry residents of nearby Mangalpur village forcibly closed the gates of the factory in a symbolic protest against pollution. They claim that the firm dumps fly ash on open fields, agricultural land, and a children's playground, and that emissions have increased. Old people and children, the worst sufferers, complain of

breathing problems and persistent colds and coughs. Walls and windows of hutments in the village are covered with black spots. According to one villager, paddy production is decreasing each year. Numerous fines have been levied against the plant for pollution since 2001. Union leaders say that pollution has been reduced, but charge management with running the plant's electrostatic precipitator only during the day, to save money.

Some 90 per cent of the factory's workers, mostly illiterate and from neighbouring states, are temporary. Non-unionised workers get only USD 1.50 per day and sometimes have to work 16 hours a day on a no work-no pay basis. No drinking water or toilets are available. Most workers, permanent staff and union leaders interviewed at the factory were unaware of the CDM project and of carbon trading and its financial implications. One local NGO worker had learned about the CDM project only from the *Telegraph*, a newspaper published in Kolkata.

Another CDM project of about the same size, aimed at using waste heat from kilns and blast furnace gases from pig iron production to generate electricity, is run by SRBSL in Durgapur, Burdwan. Most of the 1700 workers are contract labourers, who get only USD 1.30–1.50 for 12 hours' work, without the medical benefits provided for the 30 staff. Releases of dust, smoke and gases from the plant again result in respiratory problems among local residents, especially the very young and very old. Workers' living quarters are covered with a thick layer of coal dust. Water tables and paddy yields have declined, and ponds or ring wells always remain covered with a foul, thick layer of black dust. Local farmers and labourers have also been deprived of what was common land used in part for cultivation. None of the people interviewed – the management representative, the union leader, factory workers or villagers – were aware of carbon trading.

West Bengal polluting firms in other sectors are also cashing in on the opportunity to get carbon money. Jaya Shree Textiles in Prabasnagar, for example, has upgraded boilers and modified motors to reduce energy use, but still pollutes the locality. Its workers remain uninformed about the extra finance supplied by its CDM project.

What about smaller projects – ones that don't generate so many credits? Are there any local objections to them?

Some of the many biomass carbon projects planned for India are also rousing local concerns. One example is the 20-megawatt RK Powergen Private Limited generating plant at Hiriyur in Chitradurga district of Karnataka, which is currently preparing a Project Design Document for application to the CDM. According to M. Tepaswami,

a 65-year-old resident of nearby Babboor village, RK Powergen is responsible for serious deforestation. 'First, the plant cut the trees of our area and now they are destroying the forests of Chikmangalur, Shimoga, Mysore and other places. They pay 550 rupees per tonne of wood, which they source using contractors. The contractors, in turn, source wood from all over the state.' Another villager claimed that 'poor people find it difficult to get wood for cooking and other purposes'. Jobs promised by the firm, Tepaswami complains, were given to outsiders.

Meanwhile, employees at the Karnataka Power Transmission Corporation claim that its 'equipment is adversely affected due to the factory's pollution', while local villagers complain of reduced crop yields and plunging groundwater levels. Project managers deny the allegations. 'If there is deforestation', said plant manager Amit Gupta, 'then local people are to be blamed because they are supplying the wood to us'.[77]

Biomass projects have generally not been designed to benefit the agricultural sector or increase farmer incomes, and money from sale of crop residues or the produce of energy plantations on wastelands do not accrue to landless households. Nor do biogas projects necessarily benefit rural residents. The Bagepalli CDM Biogas Programme proposed for Kolan district of Karnataka state is to set up 5500 two-cubic-metre biogas digesters for households that have an average of two cattle each or more. That excludes the ordinary rural poor, who, on average, own fewer livestock.[78]

'Government figures show that there are about 5 crore (50 million) hectares of "wasteland" in India, land which…now lies open to exploitation through carbon forestry schemes. What the central government does not say is that most of this "wasteland" belongs to Adivasis and other forest-dependent communities, who will be the first to lose out from the development of such schemes.'

Madhya Pradesh activist

What about plantation projects and other forestry 'sink' projects? Are they also running into trouble?

Carbon forestry projects made a late start in the CDM market because they are so controversial. The necessary legal framework, laid out in the Marrakesh accords of 2001, was agreed only in late 2005 at the Montreal climate negotiations. So there is little concrete to point to yet.

But carbon forestry is definitely on the cards for India. The World Bank, forestry and other private sector interests, academics and the government are all busy laying plans and calculating wildly different figures for the carbon credits India could get from trees.[79] In 2003, the Indian pulp and paper lobby issued a blueprint for 'Re-Greening India' as part of its longstanding campaign to be allowed to lease 'degraded' forest land on which to grow industrial plantations. The possibility of the plantations earning carbon credits was discussed in detail.[80] A National Environment Policy Draft circulated by the Ministry of Environment and Forests (MoEF) in 2004 meanwhile confirms a new, 'liberalised' environmental policy that promotes carbon

'Joint Forest Management and Community Forest Management are being used as tools to exclude the Adivasis from their survival sources, and are compelling them to slip into poverty and migrate in search of work. Instead of…recognising Adivasi rights to the forest, the government is seeking their eviction through all possible means.'

Local activist

trading and other environmental services trades. The move towards carbon forestry also chimes with a grandiose existing plan on the part of the MoEF to bring 30 million hectares of 'degraded' forest and other lands under industrial tree and cash crop plantation by 2020, through a new type of collaboration with the private sector, state governments and local communities.[81]

Among the scores of CDM projects being contemplated for India are forestry projects in Madhya Pradesh and Andhra Pradesh states. Here, an organisation called Community Forestry International (CFI) has been surveying opportunities for using trees to soak up carbon. CFI declares that it helps 'policy makers, development agencies, NGOs,

Village in the Handia range.

and professional foresters create the legal instruments, human resource capacities, and negotiation processes and methods to support resident resource managers' in stabilising and regenerating forests.[82] Its work in Madhya Pradesh has been supported by the US Agency for International Development and the US Department of Agriculture's Forest Service, and in Andhra Pradesh, by the Climate Change and Energy Division of Canada's Department of Foreign Affairs and International Trade.

CFI suggests that, in India, the CDM would be a viable income-generating activity for rural indigenous communities. But there are strong reasons to doubt this.

Why?

In India, as everywhere else, it's not abstract theory, but rather the institutional structure into which CDM would fit, that provides the key clues to its likely social and climate outcomes.

Take, for example, a CDM scheme investigated by CFI that would be sited in Harda district, Madhya Pradesh state. Here CFI sees the CDM's role as providing financial support for Joint Forest Management (JFM), an institution that has been the subject of much celebration of late in India[83] and which would be a likely medium for a great deal of Indian carbon forestry.

What is Joint Forest Management?

Joint Forest Management is supposed to provide a system for forest protection and sustainable use through the establishment of village forest protection committees (VFPCs), through which government and development aid funds are channelled. Formalised by state governments and largely funded by the World Bank, JFM was designed partly to ensure that forest-dependent people gain some benefit from protecting forests.[84] It's already implemented in every region of India. Long before carbon trading was ever conceived of, JFM had become an institution used and contested by village elites, NGOs, foresters, state officials, environmentalists and development agencies alike in various attempts to transform commercial and conservation spaces and structures of forest rights for their respective advantages.[85]

So there should be a lot of evidence already for whether it works or not.

Yes, but there's not much agreement about what that evidence means. CFI sees the JFM programme as having improved the standard of living in Adivasi villages, as well as their relationship with the Forest Department. It also found that JFM had helped regenerate forests in Rahetgaon forest range, resulting in higher income for VFPCs, although admitting that in Handia forest range, social conflicts had resulted in decreased JFM-related investment by the Forest Department.[86]

On the other hand, many indigenous (or Adivasi) community members, activists and NGOs see JFM as a system which further entrenches Forest Department control over Adivasi lands and forest management, although the practices of different village committees vary.[87] Mass Tribal Organisations, forest-related NGOs and academics have published evidence that JFM village forest protection committees, composed of community members, function principally as local, village-level branches and extensions of state forest authority.[88]

'If large protected areas or plantations are managed for long-term carbon sequestration and storage, local people may lose access to other products such as fibre or food… [whereas] governments and companies are best placed to benefit from such schemes… [T]he frequently weak organisation (or high transaction costs of improving organisation) of the rural poor and landless will reduce their access to the carbon offset market, particularly given the many complex requirements of carbon offset interventions. Other barriers to the involvement of rural people centre on their prevailing small-scale and complex land use practices, without clear tenure systems.'[94]

Stephen Bass, International Institute for Environment and Development

Who's Encroaching? Forest Peoples and the Law

Milestones in the state's efforts to appropriate land from forest-dependent communities in India include the Indian Forest Act of 1878 and the 1980 Forest Conservation Act, which theoretically provided the central government with ultimate control over most forest land.

In 2002, quoting a Supreme Court ruling, the Ministry of Environment and Forests issued a circular to all state/union territory governments to evict all 'encroachers' from forest land. Between March 2002 and March 2004, it is estimated that 'encroachers' were evicted from 152,000 hectares of forest land, although neither the Supreme Court nor the MoEF had clarified whether the term included people carrying out illegal, commercial logging activities, or Adivasi people, or both. In 2002, an estimated 10 million Adivasi people faced the threat of eviction. The new wave of evictions is helping to create conditions conducive for commercial carbon forestry.

On 23 December 2004, however, the MoEF issued a further circular confessing that due to the lack of definition of 'encroacher', many Adivasi people had been unjustly evicted from their lands. Moreover, following heightened protest by Adivasis and support organisations in late 2004, the central government agreed in early 2005 to introduce the Scheduled Tribes and Forest Dwellers (Recognition of Forests Rights) Bill before Parliament. The Bill would provide Adivasi communities with legal recognition of their forest rights in areas of traditional occupation and use. It would also help regularise lands being cultivated by Adivasis, convert so-called forest villages[91] to revenue villages (with title deeds), and settle disputed land claims.

But Adivasi and support organisations still have to fight to prevent the Bill being diluted before it is passed by Parliament.

Communities interviewed in Harda in 2004 said that VFPC chairmen and committee members have become to a large extent 'the Forest Department's men'.

What's wrong with that?

These local JFM bodies are accused of imposing unjust and unwanted policies on their own communities, of undermining traditional management systems and of marginalising traditional and formal self-governing local village authorities.[89] In one case in Madhya Pradesh, forest authorities and the police shot dead villagers opposing JFM and VFPC policies, in an echo of hostilities between the Forest Department and various classes of other forest users that go back a century (see box above).

According to many Mass Tribal Organisations, communities and activists, JFM was effectively imposed on them without appropriate

consultation and has resulted in the marginalisation, displacement and violation of the customary and traditional rights of the Adivasis in the state.[90] Many state governments implemented JFM programmes on disputed lands. Many Adivasis have lost land and access to essential forest goods.

Current problems with JFM in Madhya Pradesh, according to many local people and activists, include:

- Conflicts within communities as a result of economic disparities between VFPC members and non-members.
- Conflicts between Adivasi groups and other communities generated by the imposition of VFPC boundaries without reference to customary village boundaries.
- Curtailment of *nistar* rights (customary rights to local natural goods).
- Conflicts over bans on grazing in the forest and on collecting timber for individual household use.
- Indiscriminate fining.

According to some Harda activists, JFM has opened deeper rifts within and between Adivasi villages and between different Adivasi groups, and has engendered conflict between communities and the Forest Department. Although funding for the local JFM scheme is now exhausted, VFPCs are still in place in many villages, recouping salaries from the interest remaining in their JFM accounts and from fines imposed on members of their own and neighbouring communities. Communities interviewed also claim that VFPC financial dealings are not transparent. In July 2004, non-VFPC villagers in Harda reported that they would like to see funding of VFPCs stopped and, ultimately, the committees disbanded. They also wanted to see forest management returned to them and their rights to their traditional lands and resources restored.[92] In the words of anthropologist K. Sivaramarkishnan, 'when environmental protection is to be accomplished through the exclusion of certain people from the use of a resource, it will follow existing patterns of power and stratification in society'.[93]

So maybe these embattled village forest protection committees are not the ideal bodies to carry out CDM carbon projects.

That would be an understatement. CFI's proposal that, in order to reduce transaction costs, a federation of VFPCs ought to be created in the Handia range to carry out a pilot carbon offset project is also questionable. So, too, is CFI's suggestion that the Forest Department should adjudicate cases of conflict there, a proposal that many community residents would find unacceptable.

Fieldwork on the involvement of the Chhattisgarh and West Bengal sponge iron industry in carbon trading, as well as on energy, forestry and climate change in India, was carried out in 2006 by Soumitra Ghosh of the NGO Nespon and the National Forum of Forest Peoples and Forest Workers (NFFPFW) (above) in collaboration with Hadida Yasmin and Arindam Das of Nespon, Devjeet Nandi of NFFPFW (see next page) and Nabo Dutta of Nagarik Mancha.

Fieldwork on the likely consequences of carbon forestry in India was undertaken by Emily Caruso (right) of the Forest Peoples Programme in collaboration with Vijaya Bhaskara Reddy (left), Yakshi Shramik, Adivasi Sangathan and local activists in July 2004.

Hadida Yasmin

Arindam Das

Devjeet Nandi

But it seems there could be an even more fundamental problem. If JFM projects are going forward anyway, even without the CDM, they're not saving carbon over and above what would have been saved anyway. So how could they generate credits?

That's not clear. And there are plenty of other problems with CFI's carbon sequestration claims as well. For example, CFI doesn't take into account the changes in numbers of people and in community and family composition to be expected over the project's 20–25 year lifetime. CFI's estimates of fuelwood used by communities in the Rahetgaon range are also inaccurate. CFI believes every family uses two head loads of fuelwood per week, but recent interviewees suggested that a more realistic figure would be 18–22, especially during the winter and the monsoon season. CFI also makes the questionable assumption that local communities would relinquish their forest-harvesting activities for the sake of very little monetary income from carbon sales, and that income flowing to VFPCs would be transparently distributed.

In order to assess how much carbon would be saved, CFI compared vegetation in forest plots at different stages of growth and subject to different kinds of pressure from humans. Yet while the total area of forest to be considered is 142,535 hectares, the total number of 50 square metre plots assessed was 39, representing a total study area of only 9.75 hectares. That may be an adequate sample in biological terms. But it's hardly enough to assess the range of social influences on carbon storage in different places.

Have any prospective carbon forestry projects been looked at in other parts of India?

Many. To take just one more nearby example, in Adilabad, Andhra Pradesh state, CFI saw possibilities of sequestering carbon by reforesting and afforesting non-forest or 'degraded' forest lands whose carbon content has been depleted by a large and growing human and cattle population, uncontrolled grazing of cattle in forests and 'encroachment' on and conversion of forest lands for swidden cultivation.

The best option, CFI felt, would be to regenerate teak and mixed deciduous forests. Clonal eucalyptus plantations would, it thought, accumulate carbon faster, and would have other commercial uses such as timber and pulp, as well as incremental returns for any interested investor, but would cost more to establish and maintain, and would be sure to be condemned by Adivasi communities and activists as a new form of colonialism.[95]

So who would carry out these regeneration projects?

Here CFI came to a different conclusion than in Madhya Pradesh. In Andhra Pradesh, it decided, the best agencies for taking on forest regeneration would be women's self-help groups (SHGs).

Which are what?

SHGs were set up by the state-level Inter-Tribal Development Agency during the 1990s as a mechanism for improving the finances of households through micro-credit schemes and capacity-building, as well as linking households with financial institutions and government authorities. CFI says that they're much more dynamic, accountable and transparent than other local institutions, such as forest protection committees, which are viewed as inefficient, untransparent, untrustworthy, and troubled in their relationship with the Forest Department.

Sounds perfect.

Except that it's hard to see how the virtues of the women's self-help groups could work for the carbon economy. For one thing, CFI states that only if the SHGs come together in a federation would carbon offset forestry projects be financially viable, given the high transaction costs involved in preparing and carrying them out. Yet it does not explain how such a federation could come about in rural communities, nor how SHGs could become involved in CDM projects and link themselves to the carbon market. Nor does it mention that SHGs currently work in relative isolation from the Panchayat Raj institutions (the ultimate village-level formal self-governing authority in rural India), the Forest Department and local forest protection committees.

But surely there's nothing to worry about yet. Maybe we can just learn as we go along.

The problem is that the mere fact that studies like CFI's are being carried out already gives legitimacy to the idea of carbon offsets in the South. Few outsiders will notice that the conclusions are suspect.

Still, you've only been talking about problems with JFM, not with carbon offset trading as such.

Whether or not JFM is involved, many Indian activists fear that by creating a market for carbon, CDM projects will engender change in the relationship between Adivasis and their lands and forests. In order to avoid conflict, any CDM project proponent will need to clarify who owns the land, the project and the carbon.[96] This immediately militates

The 'Voluntary Market' Comes to India: A Case Study

When the rock group Coldplay released its hit album *A Rush of Blood to the Head*, the band said that part of the climate damage caused by its production would be offset by the planting of 10,000 mango trees in southern India.

More than four years after the album's release, however, many of Coldplay's good intentions have withered in the dry soil of Karnataka state, where the saplings it sponsored were planted. The middleman in Coldplay's initiative was the UK's Carbon Neutral Company, which had claimed that the scheme would soak up carbon dioxide emissions and help improve the livelihoods of local farmers.

The Carbon Neutral Company contracted the task of planting the trees to a group called Women for Sustainable Development (WSD), who got GBP 33,000 for the deal. WSD is headed by Anandi Sharan Meili, born in Switzerland of Indian origin and a Cambridge graduate. She now claims that the scheme was doomed from the outset.

In the villages of Varlakonda, Lakshmisagara and Muddireddihalli, among the dozen that Mieli said had received mango saplings, no one had heard of Coldplay. Most of those who received saplings said they had not been given the nedessary funding for labour, insecticide or spraying equipment.

One Lakshmisagara villager, Jayamma, managed to get 50 of her 150 trees to survive only because she had a well on her land. 'I was promised 2,000 rupees every year to take care of the plants and a bag of fertiliser. But I got only the saplings,' she said. Some other villagers were also offered saplings but didn't have enough water to nourish them.

In nearby Varlakonda, about 10 families were given approximately 1,400 saplings. Of these, just 600 survived. Another farmer who took 100 saplings, said: '[Meili] promised us that she'd arrange the water.' But villagers said a tanker came only twice.

One of the few successes is the stretch of 300 mango trees owned by Narayanamma, 69, and her husband Venkatarayappa, 74. They were apparently the only couple to receive 4,000 rupees from Meili. At the same time, they spent 30,000 rupees on tankers and labourers. 'We were promised money for maintenance every year but got nothing', said Narayanamma.

Sitting in her spacious house in Bangalore, Meili said that she had distributed 8,000 saplings, but acknowledged that 40 per cent had died. The project had foundered, she said, because of inadequate funding. She accused Future Forests of having a 'condescending' attitude. 'They do it for their interests, not really for reducing emissions. They do it because it's good money,' she said.

The Carbon Neutral Company said that WSD had a contractual responsibility to provide irrigation and support to farmers. Richard Tipper, the director of the Edinburgh Centre for Carbon Management, which monitored the project for Carbon Neutral, said that the Karnataka project had 'experienced major problems' because WSD had not raised the necessary money to administer the project and because of a long drought.

If the Karnataka project does not offset the carbon emissions that Coldplay specified, the Carbon Neutral Company claims, it will make good the amount from other projects. Coldplay is supporting a similar project, which Carbon Neutral says is more successful, in Chiapas, Mexico.

A source close to Coldplay said that the band had 'signed up to the scheme in good faith' with the Carbon Neutral Company and that 'it's in their hands. For a band on the road all the time, it would be difficult to monitor a forest.'

Source: Amrit Dhillon and Toby Harnden, 'How Coldplay's Green Hopes Died in the Arid Soil of India', *Sunday Telegraph* (London), 30 April 2006.

against Adivasi peoples, since in India, the government claims formal ownership and control over indigenous lands and resources. Access and ownership rights are likely to be transformed into benefit-sharing and stakeholder-type relationships. Adivasi communities may lose their capacity to sustain food security, livelihoods, and fundamental social, cultural and spiritual ties. Lands Adivasis depend on could be classified as 'wasteland' and turned over to carbon production. In short, it is unclear how CDM projects could do anything but further entrench discrimination against Adivasi communities by government authorities and rural elites.

CDM afforestation projects can be established on lands that have not been forested for 50 years, and reforestation projects on lands that were not forested on 31 December 1989.[97] But forest conservation projects are also on the horizon. Although conservation schemes are not yet eligible for CDM, conservation financiers and the World Bank and Global Environment Fund are increasingly promoting the idea of protected areas as an additional source of carbon credits.[98] Indigenous peoples will clearly be in for a fight should carbon sequestration and protected area projects come together on their territories.

Overall, what's the future for CDM in India?

The country is still seen as a 'front runner' for CDM projects. The government is determined to press forward, and a lot of carbon salesmanship can be expected in the years ahead.[99] But foreign investors are worried that many projects may not get the green light from the CDM Executive Board due to being indistinguishable from business as usual. 'The sustainability just isn't there,' said one consultant employed by a European company to source carbon credits.

No Need to Know? The Secret Economy of Carbon

In 2004, the women's self-help group of Powerguda village of Andhra Pradesh, India, was given cash in exchange for planting *Pongamia* trees. The tree's seeds can be used to make a petrol substitute.

The women were given a certificate and USD 645 for 'offsetting' the emissions produced by a World Bank workshop on climate change held in Washington, DC.[100] The Bank claims that 30 years of biofuel use by government authorities in Andhra Pradesh will compensate climatically for the workshop's emissions.

The women didn't know why they had received the money. They were also unaware of the benefits that went to the carbon traders, releasers and agencies involved.

The irony is that northern Andhra Pradesh has recently been hit by one of the most devastating droughts ever, very possibly as a result of global warming. In the summer of 2004, the number of suicides in the province among farmers driven to desperation by their crippling debts reached 3,000.

The lack of discussion with affected parties that was evident in Andhra Pradesh appears to be a common denominator of carbon-saving projects nearly everywhere:

- The Project Design Documents of four different Indian biomass power projects each repeated, word for word, alleged favourable comments made by a village head. All of the projects – Rithwick, Perpetual, Indur and Sri Balaji – are located in Andhra Pradesh state, but all have different characteristics and are spread over hundreds of kilometres. Even spelling mistakes were repeated in the documents, suggesting that consultation was not genuine. The private consultants who prepared the documents, PriceWaterhouseCoopers and Ernst and Young, responded lamely that identical projects in similar geographical locations were likely to have similar Project Design Documents.[101]
- A senior legal officer at the West Bengal Pollution Control Board, Biswajit Mukherjee, was surprised to learn about CDM support for sponge iron industries in his state. How, Mukherjee wondered, can companies with long records of pollution, including some still paying penalties to the West Bengal government, start 'clean development' projects?[102]
- In Uganda, community members living close to the UWA-FACE carbon plantation project near Mount Elgon said that they knew nothing about the project's carbon credits. Members of the Bubita sub-county local council and top district officials were also in the dark. Residents wanted to know about the financial benefits FACE Foundation receives, particularly because the project encumbers their land for a long time, and planned to take the matter up with their local parliamentarian.
- The Ugandan acting deputy commissioner for forestry in the Ministry of Water, Lands and Environment, Ignatius Oluka-Akileng, told an interviewer in 2001 that his forestry directorate knew little about carbon trades involving state forest lands, nor how much foreign companies were to gain from them, and begged the interviewer to help find information.

Sri Lanka – A 'clean energy' project that was not so clean

Today's smart business money is going into buying carbon credits from projects that destroy industrial gases or methane (see the preceding 'India – A taste of the future'). These are the cheapest credits and they can be obtained with the least trouble. Yet they do nothing to address the flow of fossil fuels out of the ground.

But carbon projects that promote energy efficiency or renewable energy technologies do exist. The Kyoto Protocol's Clean Development Mechanism has dozens of such schemes in its pipeline, although they generate only a miniscule proportion of total credits. Some of these projects are even small and community-based.

So far, however, such projects are merely a bit of expensive window-dressing for the big industrial projects generating cheaper credits. In a competitive market, they appear to have little future.

But are all such projects desirable even on their own terms? For example, are all renewable energy projects good just because they can be described as 'renewable'?

I don't understand. What could possibly be wrong with promoting renewable energy?

It depends on how it's used. Let's take, for example, one of the world's very first attempts to 'compensate for' or 'offset' industrial carbon-dioxide emissions – a rural solar electrification programme in Sri Lanka.

The story begins in 1997, when the legislature of the US state of Oregon created a task force that later legally required all new power plants in the state to offset all of their carbon dioxide emissions. When companies put in bids for the contract to build a new 500-megawatt, natural-gas fired power station in Klamath Falls, they also had to present plans for 'compensating' for its CO_2 emissions. The winner of the contract, PacificCorp Power Marketing, proposed a diversified USD 4.3 million dollar carbon-offset portfolio, allocating USD 3.1 million to finance off-site carbon mitigation projects. In particular,

the firm put USD 500,000 into a revolving fund to buy photovoltaic (solar-home) systems and install them in 'remote households without electricity in India, China and Sri Lanka'.[103] In 1999, PacificCorp Power and the City of Klamath Falls signed the necessary finance agreement with a US solar-energy company called the Solar Electric Light Company, or SELCO.[104]

In all, SELCO agreed to install 182,000 solar-home systems in these three Asian countries, 120,000 in Sri Lanka alone.[105] The idea was that the solar systems would reduce the carbon dioxide emissions given off by the kerosene lamps commonly used in households that are 'off-grid', or without grid-connected electricity. On average, SELCO calculated, each such household generates 0.3 tons of carbon dioxide per year.[106] SELCO argued that the installation of a 20- or 35-watt solar-home system would displace three smoky kerosene lamps and a 50-watt system would displace four. Over the next 30 years, it claimed, these systems would prevent the release of 1.34 million tons of carbon into the atmosphere, entitling the Klamath Falls power plant to emit the same amount.

So what's the problem? It sounds like a win-win situation. The Klamath Falls plant makes itself 'carbon-neutral', while deprived Asian households get a new, clean, green, small-scale source of energy for lighting!

Not quite. Aside from the fact that such projects can't, in fact, verify that they make fossil fuel burning 'carbon-neutral' (see Chapter 3), the benefits to the South that carbon offsetting promises don't necessarily materialise, either.

Why not?

Start with the structure of the trade. Just as industries in the North have historically relied on the environmental subsidy that cheap mineral extraction in the South has provided, in the PacificCorp/SELCO project a Northern industry used decentralised solar technology to reorganise off-grid spaces in the South into spaces of economic opportunity that subsidised their costs of production through carbon dioxide offsetting.[107] Once again, the South was subsidising production in the North – this time not through a process of extraction, but through a process of sequestration.

You'll have to explain that to me.

Traditionally, fossil fuel extraction has resulted in the overuse of a good that can't be seen – the global carbon sink. And the inequality in the use of that sink between North and South has been invisible. Now, however, that inequality is becoming more visible within cer-

tain landscapes in the form of physical and social changes like those associated with the PacificCorp/SELCO project.

The solar component of the Klamath Falls plant, in essence, proposed to 'mine' carbon credits from off-grid areas in Sri Lanka. However, the existence of these off-grid areas is partially due to social inequalities within Sri Lanka. In this case, the project was taking advantage of one particularly marginalised community of Sri Lankan workers in order to support its own disproportionate use of fossil fuels.

Well, maybe. But so what? PacificCorp didn't create the inequalities in resource use that it was going to benefit from. Why should it be up to PacificCorp to solve social problems in Sri Lanka? Besides, aren't we in danger of making the best the enemy of the good here? PacificCorp may have bought the right to go on using a lot of fossil fuels, but at least the Sri Lankan workers got a little something out of the deal to improve their lives, too.

Well, as a matter of fact, that really wasn't the case, either. In practice, the PacificCorp/SELCO arrangement in Sri Lanka wound up supporting what one Sri Lankan scholar-activist, Paul Casperz, calls a feudal system of 'semi-slavery' on plantations.

Semi-slavery? Come on! Aren't you being a bit inflammatory? How could decentralised, sustainable solar power possibly have anything to do with that?

Solar power didn't create the problem, of course. But pollution markets' interventions like this one in the tea estate sector have a way of perpetuating inequality, just as in Los Angeles (see Chapter 3). The trick, as so often in the world of development and environment, is to understand that a bit of technology is never 'just' a neutral lump of metal or a piece of machinery benignly guided into place by the intentions of its providers, but winds up becoming different things in different places.

In Sri Lanka, the kerosene-lamp users that PacificCorp/SELCO ended up targeting earned their living in what is known as the 'estate' or tea plantation sector. This is a sector in which nearly 90 per cent of the people are without grid-connected electricity, compared to 60 per cent of the non-estate rural sector and only 5 per cent of urban dwellers.

A large proportion of this off-grid population was – and is – from the minority estate Tamil community,[108] which lives and works in conditions of debt dependence on tea and rubber plantations established by the British during the colonial period. Unfair labour practices in the sector have continued to keep estate society separate from and unequal to the rest of Sri Lankan society. Daily wages average USD

1.58 and the literacy rate is approximately 66 per cent, compared to 92 per cent for the country as a whole.[109] The estate population is also underserved when it comes to infrastructure. A sample survey of 50 estates found that 62 per cent of estate residents lacked individual latrines and 46 per cent did not have a water source within 100 metres of their residence.[110]

Due partly to its cost, electrification, unlike health care, water supply, and sanitation, has never been one of the core social issues that social-service organisations working among the estate population get involved in.

That would seem to make the estate sector the perfect choice for a solar technology project. I still don't see the problem.

There's no question that electrification could do a lot of good for workers and their families. By displacing smoky kerosene lamps, it would provide a smoke-free environment that reduces respiratory ailments, as well as quality lighting that reduces eyestrain and creates a better study environment for the school-going generation[111] who are eager to secure employment outside the plantation economy. Researchers have found clear connections between off-grid technology and educational achievement.

But as tea estates are regulated and highly structured enclave economies, SELCO could not approach workers without the cooperation and approval of estate management. The chief executive of one plantation corporation, Neeyamakola Plantations, was willing to allow SELCO access to the 'market' that his off-grid workers represented. He himself liked the idea of solar electrification, but for an entirely different set of reasons.

How's that?

Sri Lanka's 474 plantation estates were privatised recently. Facing fierce competition from other tea-producing countries, they need to lower production costs and increase worker productivity in order to compensate for low tea prices on the global market and wage increases mandated by the Sri Lankan government. Neeyamakola had already introduced some productivity-related incentives and thought that solar-home systems could provide another. Furthermore, with a regular electricity supply, workers could watch more television.[112] Seeing how other people in the country lived, they'd want to raise their standards of living too. For that, they'd need money. To earn more money, they'd work harder or longer, or both.[113]

So, in 2000, Neeyamakola was only too happy to sign an agreement

with SELCO for a pilot project on its Vijaya rubber and tea estate in Sri Lanka's Sabaragamuwa province, where over 200 families lived.

It sounds to me like the perfect match. If Neeyamakola focused on the bottom line, what's so bad about that? It's a matter of unleashing the profit motive for the incremental improvement of society and the environment.

No one expected Neeyamakola, SELCO or PacificCorp to operate as charities. The point is to understand whether such a business partnership was ever capable of doing the things it intended to do, what effects the partnership had on the societies involved, and who might be held responsible for the results.

So what happened?

At first, the pilot project was to be limited to workers living in one of the four administrative divisions into which the Vijaya estate was divided, Lower Division, and in nearby villages. Some four-fifths of these workers were estate Tamils living in estate-provided 'line housing'. The other fifth were Sinhalese who lived within walking distance.

In the first three months, only 29 families decided to participate in the solar electrification project: 22 of Lower Division's 63 families and seven Sinhala workers who lived in adjacent villages. In the end, the project installed only 35 systems before it was cancelled in 2001.

What went wrong?

Two things. The first thing that happened was that, in the historical and corporate context of the estate sector, the SELCO project wound up strengthening the already oppressive hold of the plantation company over its workers.

But how could that happen? Solar energy is supposed to make people more independent, not less so.

This gets back to the nature of Neeyamakola as a private firm. From the perspective of plantation management, the electrification project had nothing to do with carbon mitigation and everything to do with profitability and labour regulation.

Neeyamakola's concern was to increase productivity. Its idea was to use access to loans for solar-home systems to entice estate labourers into working additional days. The Neeyamakola accounting department would deduct a 500-rupee loan repayment every month and send it to SELCO.[114]

In order to qualify for a loan, workers had to be registered employees who worked at least five days a month on the estate.[115] The loan added another layer of worker indebtedness to management. In this case, the indebtedness would last the five years that it would take the worker to repay the loan taken from the corporation.[116]

From workers' point of view, the system only added to the company's control over their lives. Historically, the only way that estate workers have been able to get financing to improve their living conditions has been through loans that keep them tied to the unfair labour practices and dismal living conditions of estate life. To upgrade their housing, for instance, workers have to take out loans from the Plantation Housing and Social Welfare Trust. One condition of these loans is that 'at least one family member of each family will be required to work on the plantation during the 15-year lease period',[117] during which estate management takes monthly deductions from wages. Hampered by low pay and perpetual indebtedness, workers find it difficult to move on and out of the estate economy.

I see. And what's the second problem?

Inequality and social conflict of many different kinds. First, as Neeyamakola offered solar-home systems primarily to estate workers, most of whom are members of the Tamil ethnic minority, the nearby off-grid villagers of the Sinhalese majority felt discriminated against and marginalised. Disgruntled youth from adjacent villages as well as from estate families who weren't buying solar systems threw rocks at the solar panels and otherwise tried to vandalise them.

Second, local politicians and union leaders saw solar electricity as a threat to their power, since both groups use the promise of getting the local area connected to the conventional electricity grid as a way of securing votes. So they started issuing threats to discourage prospective buyers.

Third, the village communities living around the Vijaya estate feared that if too many people on the estate purchased solar systems, the Ceylon Electricity Board would have a reason for not extending the grid into their area. And without the grid, they felt, small-scale industry and other entrepreneurial activities, which would generate economic development and increase family income, would remain out of reach, making their social and economic disadvantages permanent.[118] (Any delay in the extension of the grid to the area occasioned by the PacificCorp/SELCO Neeyamakola project, of course, would have its own effects on the use of carbon, and would have to

be factored into PacificCorp/SELCO's carbon accounts. There is no indication that this was done.)

Added to all of this was inequality within the community of estate workers themselves. One consequence of Neeyamakola's focus on getting more out of its workers was that many estate residents whose work is productive for society in a wider sense were ineligible for the systems.

One example is the primary school teacher in the Tamil-medium government school that served the estate population. The daughter of retired estate workers, the teacher received a reliable monthly salary, could have met a monthly payment schedule, and was willing to pay, but was ineligible for a system because her labour was not seen as contributing directly to the estate's economic productivity and profit margin. Retired estate workers and their families were excluded for the same reason. SELCO, a firm new to Sri Lanka, was unable to ensure community-wide benefits or distributive equity within the community as a prerequisite in the design of the pilot project.

This section is based on the research of Dr Cynthia Caron. After completing her Ph. D. at Cornell University in the US on electricity sector restructuring in Sri Lanka, Dr Caron moved to Sri Lanka. She has been awarded a grant from the MacArthur Foundation and has been researching forced migration, resettlement and Muslim nationalism and its relation with Sri Lanka's ethnic conflict, as well as working on development and health projects.

On the Vijaya estate, in short, the decentralised nature of solar power – in other contexts a selling point for the technology – had quite another impact and meaning in the context of Sri Lanka's estate sector. It provided the company that was controlling the 'technology transfer' with a new technique to exert control over its labour force and ensure competitive advantage, while exacerbating underlying conflicts over equity.

It's interesting to note, incidentally, that solar projects in Sri Lanka often fall short even at the household level, where many families end up reducing their consumption of kerosene by only 50 per cent.[119] There are many reasons for this. Kerosene use is necessary to make up for faulty management while household members become acquainted with the energy-storage patterns of the battery and system operation. Households also face problems managing stored energy, with children often using it all up watching afternoon television. And local weather patterns and topography likewise take their toll. In some hilly areas with multiple monsoons, solar can supplement kerosene systems at best for a six- to nine-month period, depending on the timing and duration of the monsoon.

Did PacificCorp's electricity customers – or the Oregon legislature – know about all this?

Given the geographical and cultural distances involved, it would have been difficult for them to find out. On the other hand, it seems unlikely that Northern consumers of electricity – if they are informed of

such details – will accept carbon-offset projects that involve not only dubious carbon accounting, but also blatantly exploitative conditions and the reversal of poverty alleviation efforts.

This is another reason for doubting how long-lived undertakings like PacificCorp/SELCO's will be. From the beginning, they have been more about 'preserving the economic status quo' and promoting cost efficiency in Northern countries than about supporting equity in the South.[120]

OK, I can see there were some problems. But surely social and environmental impact assessments could have identified some of these problems in advance. With proper regulation, they could then have been prevented.

This is a key issue. For example, the solar technology could have been reconfigured so that an entire line of families could have pooled resources and benefited, rather than just individual houses.

But setting up an apparatus to assess, modify, monitor and oversee such a project isn't by itself the answer. Such an apparatus, after all, would have brought with it a fresh set of questions. Who would have carried out the social impact assessment and would they have been sensitive to local social realities? Would its recommendations have been acceptable to Neeyamakola? Would its cost have been acceptable to PacificCorp? What kind of further oversight would have been necessary to prevent an assessment from merely adding legitimacy to a project whose underlying problems were left untouched?

Just as a technology is never 'just' a neutral piece of machinery which can be smoothly slotted into place to solve the same problem in any social circumstance, so the success of a social or environmental impact assessment is dependent on how it will be used and carried out in a local context.

But if success is so dependent on political context, how will it ever be possible for new renewable technologies to make headway anywhere? If it isn't possible, then we might as well give in and keep using fossil fuel technologies! We might as well go along with ExxonMobil when they claim that we have to go on drilling oil since anything else would be to betray the poor!

The alternative is not to accept the dominance of fossil fuel technologies. Their continued dominance also does nothing to improve the position of disadvantaged groups such as Sri Lanka's estate Tamils. Nor is the alternative simply to accept the system of global and local inequality exemplified in Sri Lanka's estate plantation sector.

The alternative, rather, is to act using our understanding that what keeps marginal communities such as that of Sri Lanka's estate Tamils

in the dark, so to speak, is not only a matter of 'suboptimal' use of technology, but also a deeper pattern of local and global politics. Cutting fossil fuel use means understanding this deeper pattern.

Up to now, climate activists and policy makers have often told each other that 'the essential question is not so much what will happen on the ground, but what will happen in the atmosphere'.[121] The example of the PacificCorp/SELCO/Neeyamakola rural solar electrification project helps show why this is a false dichotomy. What happens on the ground in communities affected by carbon projects is important not only because of the displacement of the social burdens of climate change mitigation from the North onto already marginalised groups in the South. It is also important because what happens on the ground influences what happens in the atmosphere.

Thailand – Biomass in the service of the coal and gas economy

The experience of Sri Lanka shows that not all projects that go under the name of 'renewable energy schemes' promote local betterment, foster local autonomy, or help in the transition away from fossil fuels.

Other types of 'renewable energy' projects may turn out to be of equally questionable climatic or social value when integrated into the carbon market as supports for a system dominated by fossil fuel technologies and corporate expansion. A good example is a 'biomass energy' project seeking CDM support in Yala province in Thailand's troubled far south.

There, an approximately 23-megawatt power plant fuelled by rubberwood waste and sawdust is being developed by a diverse group of companies linked by their interest in the carbon trade. They include:

- Gulf Electric, an independent power producer 50 per cent owned

by Thailand's Electricity Generating Public Company (EGCO) and 49 per cent by Japan's Electric Power Development Company (EPDC).

- Asia Plywood (AP), a Yala rubberwood processor, next to one of whose factories the plant would be located.
- Det Norske Veritas (DNV), a Norwegian 'risk management' consultancy which has managed to parlay its experience in certifying the credibility of pioneer carbon schemes such as Yala into a major share in CDM's consultancy market.

EPDC is a largely fossil-fuel-oriented company and the largest single user of coal in Japan.[122] It operates 66 coal-fired and hydropower stations and burned USD 652 million in fossil fuels in 2001 alone.[123] It also has an interest in six gas-fired power generating plants in operation or under construction in Thailand, totalling 2,733 megawatts.[124] Nor, with a large new coal-fired power station under construction in Yokohama, does EPDC contemplate any change of direction in the future. 'Coal offers stable supply and outstanding economical efficiency,' says a company presentation, 'hence we predict it will support world energy consumption throughout this century. Our great mission is to ensure that coal is burned cleanly, thus reducing the burden on the environment.'[125]

Accordingly, EPDC's main response to global warming is coal gasification, which of course does nothing to halt the flow of fossil carbon to the surface, and the development of a nuclear power plant. For EPDC, the point of investment in Yala would be to gain carbon credits to help it, and Japan generally, maintain current levels of fossil-fuel combustion in the face of Kyoto pressures.

EGCO is also largely structured around fossil-fuel technologies. One of EGCO's gas-fired power stations, in fact, is operated in partnership with UNOCAL, a US multinational fossil-fuel firm that is anti-Kyoto Protocol and sceptical about climate change.

Gulf Electric, meanwhile, with a mainly gas-fuelled generating capacity, has become well known in recent years partly due to the overwhelming defeat in March 2003 of its proposal to build a 734-megawatt Bo Nok coal-fired power plant on the Gulf of Thailand. Local people in Prachuab Khiri Khan province concerned about pollution and other potentially destructive effects of the project had mounted a successful regional and national campaign against it. Following their victory against Gulf, the company moved quickly to propose a gas-fired substitute plant further up the coast.

If any further evidence were required that the sponsoring firms are

Leaders of the movement that defeated the proposal for a coal-fired power plant at Bo Nok on the Gulf of Thailand meet the press in 2004. The proposed power plant was a project of Gulf Electric, a firm that hopes to gain carbon finance for a joint venture biomass plant using rubberwood waste. Jinthana Kaewkhaaw (right), a local villager with a fourth-grade education, was awarded an honorary Ph. D. from Thailand's alternative Midnight University for her tireless efforts against the Bo Nok plant. Galok Wat-Aksorn (left) is the widow of another local leader, Charoen Wat-Aksorn (pictured on her T-shirt), who was murdered over a land dispute connected with the struggle. The leaders were voicing their support for another movement further south battling against the establishment of a gas pipeline and gas cracking plant that encroaches on Muslim *wakaf* common land and degrades the local environment. The alliance of the two movements, one composed of mainly Buddhist villagers, the other composed of mainly Muslims, defies government attempts to pit Thailand's majority Buddhist community against Muslims in the south of the country.

not treating the Yala project as a step away from fossil fuels, there is the fact that they had originally planned to build the power plant without any carbon finance at all. It is only since the depths of the Thai financial crisis, in 1998, that they have contemplated securing supplementary funding through carbon trading.[126] Encouraging them to develop the idea have been subsidies from Thailand's Energy Policy and Planning Office's Energy Conservation Promotion Fund[127] as well as portions of both a USD 30 million OECF loan under a 1999 five-year Global Environmental Facility (GEF) project and a GEF outlay of USD 3 million toward commercial risk premiums.[128]

But if the point of the Yala project is to help keep corporations using fossil fuels, how can the credits it generates possibly be tokens of measurable climate benefits?

The project's proponents claim that it would save a measurable amount of carbon by 'replacing' some of the electricity in the Thai grid that's now generated by burning fossil fuels.

How do they know that the plant would do that?

The validator, DNV, realised it had no way of determining that the new project's power would be replacing either combined-cycle natural gas or oil-fuel electricity in the national grid.[129] It was also told by Thailand's electricity authority that it was 'often a mistake to see a direct link of displacement between an increase in one component of the grid and a reduction in another'. So DNV looked at the 'average' carbon intensity of electricity from the Thai grid. It then subtracted the figure corresponding to the projected carbon intensity of electricity from the project and multiplied that by the project's output. DNV argued that the resulting figure is conservative, since expansion plans by the Thai electricity authority featured a 'higher carbon intensity

than the grid average used by the project'. This is in spite of the fact that the authority's figures were a subject of hot dispute in Thailand and carbon intensity per year varies by about 20 per cent.[130]

It all sounds a bit too much like guesswork, given that the object is the calculation of a precise number of tonnes of CO_2 saved. How can they possibly be sure that if the project didn't exist, exactly that amount of electricity would have been generated through nothing better than the current 'average' fuel mix?

They can't. But it's a procedure that's acceptable in principle to the UN.

I assume the consultancy also factors in how much additional use of fossil-generated EPDC electricity the project might encourage in Japan?

No.

Why not? If the project helps reassure electricity consumers or investors in Japan that it's OK to keep using coal-generated electricity there, doesn't that add to the carbon debit of the project?

Yes, it does. But Kyoto carbon accounting tends to ignore such realities, not that they could be measured anyway (see Chapter 3). So DNV was under little obligation to present an answer to the question in any of the hundreds of pages of highly technical documents on the Yala project. Assessing the many indirect carbon or climatic effects of the project, according to DNV, 'is not necessary in our opinion'.[131]

Let me ask another question, then. If the project was going to be built anyway, then what exactly does it 'save' that deserves a climate subsidy? It's just business as usual.

That's right, and the CDM rulebook demands that CDM projects prove that they are not business as usual. As a result, the Yala project's proponents have had to produce some evidence that it isn't business as usual.

How have they done that?

With difficulty. At first, project proponents claimed that, without carbon credit sales, the project's return on equity would be lower than 'desirable' or 'normal' but that the good publicity associated with a climate-friendly project would make up for this. When NGOs pressed DNV to provide evidence for these claims, DNV said that it did not have permission to make public the 'confidential' financial analysis the project proponents had given it. Project proponents also asserted that the planning needed for the project was a 'barrier' that required carbon finance to overcome, and that the project was tech-

nologically novel in the Thai context.[132] Later on, the project developer also noted that the project was sufficiently financially shaky that it had to be put on hold in 2002.

But even if that's true, that wouldn't prove that the project could be undertaken only with carbon finance.

No. And there's a lot of evidence that, in fact, the prospective carbon income of the project has no weight at all with the investors. For example, uncertainty about whether the project would ultimately be allowed to be registered with the CDM, or about whether the Thai government would overcome its initially sceptical stance towards CDM projects, does not seem to have had any effect on the project's original construction schedule. What's more, Sarath Ratanavadi, managing director of Gulf Electric, was quoted in the *Bangkok Post* on 13 June 2003 as saying that Gulf Electric and EPDC 'will go ahead with the 800 million baht project [Yala biomass] even without CDM'.

What was DNV's response to that?

It protested that the project's business-as-usual status 'is not as obvious as asserted'[133] and said it had consulted with EPDC about Sarath's statement.

From a scientific point of view, that's not terrifically convincing.

No. For this project to be registered with the CDM would, in fact, probably be a net loss for climatic stability, since it would enable the Japanese government to write down its Kyoto commitment by half a million tonnes of carbon dioxide without providing anything verifiable in return. Nevertheless, the controversy over Yala is representative of the level of debate that still prevails in front of the UN committees and panels responsible for overseeing the CDM.

Well, if the project's benefits for the climate can't be verified or quantified, perhaps we should forget about looking at it as a carbon project and just view it as a standard development project with an unusual prospective source of funding. Does it at least provide some benefits for local people?

Many local residents in fact quietly oppose the new development on Asia Plywood's Yala site as being likely to reinforce local imbalances of power over air and water quality. They've long felt animosity toward AP for causing pulmonary health and other problems through smoke and ash pollution of local air, water and land, and profess 'no trust' in the firm. Subdistrict officials even allege that the firm has not paid its full share of taxes.

Biomass is not always benign. *Noo Nui,* a comic figure from the shadow puppet folklore of Southern Thailand, registers his opposition to a proposed power plant using waste biomass on the grounds that it will 'destroy the environment'. The project in question didn't try to gain access to carbon finance, but is similar to one in the same region that did.

But why should any of that make any difference to their view of the new project?

Because for them, the important thing about the project is not the theory behind it, but who is going to carry it out. Local people might well agree with DNV that the disposal of rubber wood residues at Asia Plywood and other installations is 'one of the most serious environmental problems in the Yala community'. But they view corporate reliability as a more important prerequisite for solving such problems than technical proposals. Refusing to abstract from the local political context, they see narrowly technical factors such as new equipment or CDM certification as irrelevant as long as underlying conflicts between company and community are not tackled. 'If current problems are not solved', one local health official interviewed asked, 'how are new problems going to be addressed?'

Shouldn't DNV have taken account of such views?

DNV was well aware of local people's view that AP should solve its existing problems with 'noise, wastewater and solid waste' before attempting anything else, and should communicate the details of construction to the community as well as involve it in monitoring. Yet it had few incentives to take villagers' political and social analysis seriously.

DNV did write about a 'comprehensive public participation programme' to 'accurately inform local residents, government officials and other concerned members of the public about the Project and expected impacts' and 'obtain feedback, mainly from the local communities and concerned government agencies, with regard to their opinions and concerns about the Project'. Those to be consulted included

the subdistrict administrative authority's committee and residents in 'surrounding villages'. Yet there is little evidence that this 'comprehensive' programme was satisfactory to local residents. According to DNV itself, the meeting it claimed to hold with the Lam Mai subdistrict authority took less than one hour.

Throughout, DNV presented the project and its participant firms as a 'black box' or neutral machine into which formulas for environmental improvement, participation and good community relations could be fed with near-automatic results. Local environmental problems were seen as stemming from a mere technical gap – one that the CDM project would help fill.

Similarly, when at an August 1999 public consultation few respondents agreed with the project, DNV put it down to 'previous dissatisfaction with the dust caused by AP's operation' and claimed that, following the installation of a new boiler which uses sawdust, 'Lam Mai [subdistrict] residents no longer disagree with the Project'.[134]

Are you saying that that's not true?

It's certainly not the impression given by a number of local residents interviewed more recently. To them, the workings of the firms involved in the project, far from being enclosed in a 'black box', are both open to view and of powerful interest.

Several people interviewed pointed out that the AP's 'public participation programme' referred to so uncritically by DNV, instead of involving dissemination of useful information, has featured expenses-paid tours for local people to biomass power plants in Thailand's central region. Such tours, they reported, have included hotel accommodation, food and free visits for some male participants to local prostitutes, but no opportunities for close inspection of the plants in question or chances to meet local people.

Local residents also pointed to AP's name on a pavilion that the company gave to a Buddhist temple adjacent to its factory after temple monks complained about pollution – an act incurring powerful reciprocal obligations. They noted that other modes of persuasion have also been used. One elderly resident interviewed reported receiving no less than three death threats as a result of voicing criticisms of the AP project.

So some of the locals aren't too keen on carbon trading?

Who knows? They understand well what biomass is, but they've never had a chance to discuss the carbon market. Most people are unaware of the AP project's projected role in this new global trade.

South Africa – Carbon credits from the cities

Durban Solid Waste (DSW), part of Durban's city council bureaucracy, manages a landfill site called the Bisasar Road dump. The largest such operation in South Africa and one of the largest in the Southern hemisphere, the dump has been in operation since 1980. Located in an area that was designated for people of Indian descent under apartheid's Group Areas Act of 1961, the dump is also a primary source of livelihood for the mainly African, and poorer, Kennedy Road settlement, established in the late 1980s and now numbering nearly 1,000, who recycle materials from the dump while struggling with officials and business to gain more secure rights to the land their houses occupy.

Although the site is licensed only to receive domestic waste, medical waste, sewage sludge, private corporate waste and large shipments of rotten eggs have also wound up there. Cadmium and lead emissions are over legal limits, and limits for suspended particulate matter also often exceeded. Concentrations of methane, hydrogen chloride, and other organic and inorganic compounds including formaldehyde, benzene, toluene and trichloroethylene are high.

That sounds dangerous.

Local residents report many health problems, with six out of ten of the houses in one downwind block on the nearby Clare Estate reporting cancer cases. The causes of each such individual case of disease are notoriously difficult to pin down. They could include emissions from incineration practices, which stopped in 1997, other emissions from the dump either before or after, or other factors. Lindsay Strachan, Project Manager of eThekwini Engineering and Projects, claims, for example that the Kennedy Road settlement, which burns wood and other materials for heating and cooking, is just as likely as the Bisasar Road dump to be the source of health threats.[135]

But with some houses only 20 metres away from the landfill site

boundary, it's hardly surprising that many in the community want the dump shut down. Under pressure, the city council itself pledged in 1987 to close the site and turn it into sports fields, picnic areas and play areas for children. When, in 1996, the council reneged a second time on the promise, some 6,000 local residents signed a petition of protest, with many blocking the dump site entrance and staging demonstrations and marches. Yet the site was kept open and even started receiving rubbish diverted from a dump in a wealthy white-dominated Durban suburb, which was closing as it was 'earmarked for upmarket property development'.[136]

The Bisasar Road landfill dump.

In June 2002, Clare Estate resident Sajida Khan filed a lawsuit against the eThekwini municipality and the federal Department of Environmental Affairs and Tourism for negligence in permitting the dump to stay open. After three years of delays, the case was due to be heard in the autumn of 2005, but due to Khan's poor health (see below), the case will remain in the docket until she is declared fit enough to participate. In the meantime, the Department of Water and Forestry at the provincial level has been delayed in rendering its decision on an appeal against keeping the dump open, estimated to have cost the city R40,000 to fight.[137]

Very unpleasant, clearly. But what does all this have to do with mitigating climate change?

In 2002, the World Bank's Prototype Carbon Fund (PCF) signed an agreement with DSW to promote a prospective CDM project to ex-

tract methane from the Bisasar landfill and burn it to generate up to 45 megawatts of electricity for supply to the national grid.

I'm not sure I understand. How can a project that emits carbon dioxide using fuel from a smelly landfill site be climate-friendly?

The idea is that the electricity generated by the project would 'replace' electricity that otherwise would have been generated by burning coal. It's claimed that the project would generate enough power to light up 20,000 informal houses or 10,000 formal-sector houses. Because burning methane is less climatically damaging than simply releasing it, and better than burning coal (the dirtier fuel usually used) the project is better than the alternative.

The alternative? There's only one?

'The poor countries are so poor they will accept crumbs. The World Bank know this and they are taking advantage of it.'

Sajida Khan, Bisasar Road community resident

Well, of course, in reality there are many alternatives. But the carbon credit market demands that there be only *one* alternative. If there's more than one alternative, then you'll have more than one number corresponding to the carbon 'saved', and you won't be able to assign a single number to the number of carbon credits your project is producing. So you won't have anything definite to sell.

But how can other alternatives be ignored?

They are classified as 'implausible'.

Sajida Khan

Who says they're implausible? What about using the money to close the dump down and treat some of the waste? What about just pumping the landfill gas into the nearby Petronet gas pipeline network so that it would not need to be burned on site? Or finding ways of using electricity more efficiently? Or more non-fossil community-level power sources? None of these sound implausible to me.

Nevertheless, none of them can be acknowledged as alternatives, because to do so would make it impossible to calculate the credits for the project under consideration. That's one of the ways that a seemingly 'technical' accounting system can help limit the political choices a society can make to small, incremental variations on business as usual.

How was such a one-sided view of the choices available enforced?

In the early phase of the project, authority for deciding what would and would not be possible in South Africa in the absence of the Bisasar Road scheme was quietly given to two individuals at the PCF in Washington, DC – Sandra Greiner and Robert Chronowski.[138] Their decision was clothed in many pages of impressive numbers and reinforced through meetings and professional review.

Didn't anybody question whether two people in Washington had the right to decide what the alternative energy future of Durban might be?

How? Information dissemination and public consultation on the project proposal were carried out over the internet, to which only a small minority of the local community have access. Time allocated for objections in late 2004 was a mere 10 days. And few outside the immediate area were either interested in or aware of what was going on.

The fence separating the dumpsite from the surrounding communities.

Meanwhile, Durban officials claimed that without the USD 15 million provided by the Prototype Carbon Fund, they would not bother trying to recover the methane as fuel, since the electricity generated in the process costs so much more per kilowatt hour than the local power utility charges for its coal-fired power.[139]

All right, fair enough. But assuming that's true, all it proves is that continued raw methane release and coal-fired power is a choice that would have a reasonable economic rationale, not that it is the only choice that could be made.

That's all that's required, under the rules, for the project to create carbon credits.

All right. But who would buy carbon credits from the dump?

All PCF investors get *pro rata* shares of PFC project credits. These investors include British Petroleum, Mitsubishi, Deutsche Bank, Tokyo Electric Power, Gaz de France and RaboBank, as well as the governments of the Netherlands, Norway, Finland, Canada, Sweden and Japan.

Is this a good thing for local people who live around the dump?

That depends a lot on who you ask.

Well, what does the PCF say?

The PCF says that improving the 'financial position of DSW' would also benefit local people and send a 'clear signal' to them that 'the environment is a number-one concern in South Africa and is being dealt with in the best way possible'.

And what does the local community say?

Again, that depends on who you ask. But let's start with Sajida Khan, a member of the Indian community on the border of the dump. Khan, who was diagnosed in 1996 with cancer, and whose nephew died of leukaemia, had this to say in 2002: 'To gain the emissions reductions credits they will keep this site open as long as possible. Which means the abuse will continue as long as possible so they can

continue getting those emissions reductions credits. To them how much money they can get out of this is more important than what effect it has on our lives.'[140]

Khan and some other community members see PCF support for the methane project as having thrown a lifeline to the dump. They note that the PCF's crediting period for the project is seven years, twice renewable, making a total of 21 years. According to the PCF, 'because of the growing waste generation per capita in the municipality…there is no plan to close…the Bisasar Road site…during the PCF project life.' To Khan and colleagues, this new lease on life for the dump, together with the PCF claim that Bisasar Road is an 'environmentally progressive…world-class site' leave a very bitter taste in the mouth.

Understandably so. But are there other views?

One of the municipality's top officials responsible for the project, Lindsay Strachan, has little patience with opinions like Khan's. Because protesters 'can't think globally any more,' he complains, 'the project is literally slipping through our fingers.'[141] Strachan claims the city is committed to closing the dump and continuing to extract methane thereafter, although a carbon project document he helped write states that 'it is not reasonable' to expect that the municipality would close the dump before it is full, and that no plans exist for construction of replacement sites.[142]

'[The Prototype Carbon Fund is after] a cheap bang for their buck; they basically just get the low cost credits…they pillage the country and don't contribute to its sustainable development.'

Sheriene Rosenberg, SouthSouthNorth, South Africa

But there are more than just two sides to this story. Most of the African residents of the nearby Kennedy Road settlement also support extending the life of the dump. For one thing, the dump provides most of their current livelihood. For another, the new World Bank carbon project has shrewdly promised to provide jobs and a few local scholarships. The Bank also pushed DSW to conduct 'consultative exercises' in Kennedy Road, which constituted one of the few occasions that the community had been officially recognised. Kennedy Road residents could not help but contrast that recognition with what they perceive as the Bisasar Road community's lack of sympathy for their ongoing struggles to secure rights to the land they live on so precariously.

But presumably the World Bank and DSW are merely trying to divide the local Indian and African communities from each other?

Kennedy Road activists are no more under any illusions about the agendas of outside agencies than they are in the front line of international debate over climate change. But, as Raj Patel of the local Centre for Civil Society at the University of KwaZulu-Natal observes, when communities have been systematically denied dignity,

'consultations' such as those staged by DSW under World Bank pressure may be the only 'substitute for marginalisation' available.[143]

Patel also observes, however, that as of 2006 the dump 'seems to have receded as a site of struggle' for Kennedy Road residents, 'simply because there are new places and new ways to fight, and bigger things to fight for than the meagre prospect that a family member will get a job picking garbage on the dump.'[144]

In favour of the carbon project, isn't there also the argument that by extracting methane, the scheme not only prevents quantities of a powerful greenhouse gas from being dispersed in the atmosphere, but also benefits local air quality?

The project might clear the air, to some degree – although a lot of associated pollutants would still be released, including carbon monoxide and various hydrocarbons.

Clean air, however, is a right South Africans are constitutionally guaranteed even in the absence of carbon trading schemes. In a sense, therefore, Kyoto commodity production is being staked here to the non-enforcement of environmental law. DSW, PCF and their consultants are helping to enclose not only local communities' air, but also their future. In the process the World Bank is also undermining its own stated concern with 'good governance' and the rule of law, because it's providing an incentive not to enforce the constitution.

What's the future of the project?

Uncertain. Project opponents, backed by sympathisers in a range of countries, have definitely had an impact. Sajida Khan and others have filed formal complaints, citing technical, environmental, health and social problems. Several newspaper articles were published on Khan and her struggles, and in November 2004, World Bank staff were forced to visit Durban to have a look for themselves. In addition, in late August 2005, DSW submitted a Project Design Document to the CDM Executive Board for two much smaller methane projects at La Mercy and Mariannhill, which together would yield only one-sixtieth of the carbon credits of Bisasar Road. Although the two projects had previously been part of a package including the Bisasar Road scheme, the documents conspicuously avoided mentioning it.

Are there other carbon projects afoot in South Africa?

Quite a few. One is a project associated with Sasol, a chemicals, mining and synthetic fuels company so huge – with nearly USD 12 billion in assets and USD 1.4 billion in profits in 2004 – that it has a city named after it.

'What are we going to do about carbon trading? Our president [Thabo Mbeki] is saying, "Where is this project? Where is any project? Where's anything?" [There is] a big rush to get South Africa on the map. [Yet now, due to appeals,] the first project in Africa is stopped in its tracks and… literally slipping through our fingers… Japan is calling me. But I say we have no project… [The 2 per cent of people who object] are saying that this is in my backyard, I can't think globally any more… South Africa probably won't be able to say that we spearheaded the CDM market or better still we spearheaded the emissions reductions market… There is disappointment, but such projects will go on elsewhere, in Brazil or Chile or India or Iran or Kampala.'

Lindsay Strachan, Manager of Engineering and Projects, Durban Solid Waste

Kennedy Road residents on the march for community rights. Many have opposed closing the dump and have criticised opponents of the Bisasar Road CDM scheme.

Sasol is looking for carbon finance for an 865-kilometre pipeline that will carry natural gas from the Temane and Pande fields in Mozambique to its facilities in Sasolburg and Secunda. The gas will supplement coal as the feedstock for Sasol's liquid fuel synthesis processes at its plant at Secunda, a town 100 kilometres west of Johannesburg, and replace it entirely in Sasolburg, which lies 60 kilometres south of Johannesburg.

Sasol justifies its bid for carbon money by claiming that since gas is a cleaner-burning fuel than coal, it will be releasing a massive 6.5 million tonnes less of CO_2 equivalent into the atmosphere annually than it would if it had decided to continue using coal. That makes the project one of the biggest CDM projects in Africa to date.

Bigger than Bisasar Road?

Yes. The project would generate twice the credits of Bisasar Road, even though the emissions it is 'saving' are of carbon dioxide, which is eleven times less potent a greenhouse gas than the methane seeping out of the Bisasar dump.

How does Sasol justify the claim that it's helping the climate?

Without carbon money, Sasol argues in its CDM documents, it would have had to continue using coal as its only feedstock. True, there are signs that the firm was going to diversify its feedstock sources

anyway. Sasol's coal mine in Sasolburg 'reached the end of its economic life in 2001,'[145] and trucking in replacement coal from Secunda was not 'economically sustainable'.[146] Yet the company insists that the obvious choice for a new feedstock source was not gas from Mozambique but rather digging a new coal strip mine near Sasolburg. Although there was 'public concern' over this proposed mine, which would have been sited on the banks of the Vaal river,[147] as well as 'a desire from Sasol and the South African government to reduce local air pollution', the company insists that there was no incentive or legal obligation not to go with coal.[148] The pipeline option, on the other hand, was blocked by 'numerous and difficult-to-manage barriers' including capital costs, political instability, and fluctuating gas prices – all of which needed carbon finance to overcome.

I guess that's reasonable – if you think a fossil fuel company should be granted carbon credits at all.

The only trouble is that Sasol's claims are contradicted by several of its own executives' accounts of how the pipeline option was chosen. For example, at a June 2005 meeting of the South African National Energy Association at the Siemens Headquarters in Sandton, outside of Johannesburg, Sasol's Natural Gas Supply Manager, Peter Geef, noted that the Mozambique pipeline had already been 'completely paid for' and that there were no outstanding financial inputs. Upon being questioned about the CDM, Geef responded that 'yes, we are indeed trying to get some carbon finance for this pipeline…you get a lot of pay-back in terms of dollars per tonne', but that 'we would have done this project anyway'.[149]

'You shouldn't be selling off your crown jewels so the North can keep polluting.'[169]

Sheriene Rosenberg, SouthSouthNorth, South Africa, June 2005

So essentially Sasol is asking for carbon finance not to do something it would not have done otherwise, but as a bonus for what it has already done but just wished was more profitable.

Exactly. Even Richard Worthington of the South African Climate Action Network (SACAN), who supports carbon trading projects in theory, says that the project merely entrenches Sasol's pipeline monopoly. He adds that the company's quest for extra income from carbon credit sales 'is just baseless greed'.[150]

What about the other South African projects you mentioned.

Another South African landfill gas CDM project is located at the Bellville South Waste Disposal (BSWD) dump in the north of Cape Town municipality. This project aims at capturing 70 per cent of the site's methane, instead of the current 30 per cent, which is merely flared.[151] The methane would then be used as fuel by local industry.

Sasol's Sasolburg plant, seen from the south.

Used in the early 1930s for sewage disposal, the site has been a dumping ground since the 1960s. Originally far from human settlement, it is now surrounded by the largely coloured and Indian Belhar community.[152] Although the site was closed for a time due to the 'close proximity to residential areas and the risk of contamination to the underlying Cape Flats aquifer',[153] it was later reopened, enraging local residents, who formed two separate organisations in opposition: the Landfill Monitoring Group and the richer and more Indian-based Belhar Development Forum. Both groups were relieved by the city's pledge to close the site in 2006 but alarmed at negotiations that are now under way to extend its life until 2009.

Does the extension of the life of the dump have anything to do with the CDM project?

Project developer Walter Loots, head of Cape Town Solid Waste, denies this. Cape Town 'is running out of landfill space', Loots says, and 'the only alternative would be a higher-cost regional landfill 60 kilometres out of town'.[154] It hasn't been revealed whether any increase in available gas caused by keeping the dump open was included in the CDM accounting for the project, as was the case at Bisasar Road in Durban.

And who's developing the project?

Unlike the larger Bisasar Road scheme, Bellville is being developed under the close supervision of a non-profit consultancy, South-SouthNorth (SSN), in a municipality in which climate change issues have their own office. It has also gained 'Gold Standard' status as a project meeting the highest standards for environmental and social sustainability.

Sasol gas flaring. Such flaring is alleged by environmentalists to be in breach of South African law.

What's the Gold Standard again?

The Gold Standard was originally an attempt by the World Wide Fund for Nature to correct the CDM's 'failure to demonstrate "additionality" and deliver added environmental and social benefits'.[155] It is now being overseen by the Swiss-based organisation BASE. As discussed in Chapter 3, the Gold Standard gives a special certificate to CDM projects that deliver 'real contributions to sustainable development in host countries plus long-term benefits to the climate'.[156] The associated credits are sold at a premium.

However, it's not clear how a project that is widely opposed by the local community could make a 'by no means insignificant contribution towards local sustainability'. The project can be considered 'ecologically sound,' moreover, only in a very relative sense. As Walter Loots admits, current landfill practices are not sustainable.[157] Organic material and non-organic material are not separated,[158] even though waste sorting could conceivably create badly needed employment. This makes the capture of methane at Bellville 'an inefficient solution to an avoidable problem'.[159] Yet the city can hardly spend money on waste separation and recycling when 155,000 families in informal settlements still have no roadside collection of waste.[160]

'The carbon market doesn't care about sustainable development. All it cares about is the carbon price.'

Jack Cogen, president, Natsource (the largest private buyer of carbon credits)

The Gold Standard doesn't seem to be encouraging projects that have longer-lasting social and environmental benefits for the community, then.

Not in this case, no.

But surely there must be more encouraging examples somewhere that can point a way forward for the carbon market.

Well, there are plenty of positive initiatives in all the countries mentioned in this chapter. Costa Rica has stopped oil exploration in sensitive areas. Indian groups are organising to stop sponge iron production across four states. Thai villagers are working against coal-fired power plants.

The trouble is that such initiatives exist in opposition, as it were, to the carbon credit market, which is designed to *extend* fossil fuel use. If you look for 'alternatives' *within* the CDM and the carbon 'offset' market, you're likely to be repeatedly disappointed.

Let's nail down this point by looking at one final South African CDM project – probably as good a carbon project as you're likely to see anywhere. This is the Kuyasa low-cost housing energy upgrade project. Certified by the CDM Executive Board on 27 August 2005, Kuyasa is the first Gold Standard project in the world to generate certified emissions reductions credits and has been widely applauded both nationally and internationally.

There! That's the sort of example I want to know about. Tell me more.

Well, I'm not sure you'll want to hear it. What Kuyasa shows, in the end, is that such 'good' schemes are unlikely to survive in the carbon credit market and seem virtually incompatible with it.

How do you figure that?

Well, let's go over the history of the project and its virtues first.

Planning for the Kuyasa scheme, located in a neighbourhood in the township of Khayelitsha outside of Cape Town, got underway in 2002. Its pilot phase, launched in July 2003, involved retrofitting eight Reconstruction and Development Programme (RDP) homes and two crèches with insulated ceilings (where there would normally just be a corrugated steel roof), replacing regular lighting with low-watt compact florescent bulbs, and installing solar water heaters on the roofs. Partly because residents would have used grid electricity to heat their water in the absence of the solar heaters, the project is held to reduce demand for coal-fired electricity. The claim is that in total, 2.85 tonnes less CO_2 are generated per household per year as a result of the project. The project's next phase will see the target group expand from 10 to 2,309 RDP homes throughout Kuyasa.

The scheme's pilot phase has been a source of great pride for the project developers – the city of Cape Town and SSN – as well as its

Bellville, viewed from the dumpsite.

beneficiaries. It is also, unusually, actively supported by local residents, who have been consulted from the beginning. Kuyasa's ward development forum put together a broad-based steering committee of community members who assisted in the design of the project, decided which households would participate in it, and mapped out how the project would move forward into its next phase. The steering committee also helped facilitate contacts and a flow of ideas between the community and the project developers.

The project has a particularly high Gold Standard rating in terms of 'social sustainability and local development and has a minimal impact apart from the reduction of GHG on the natural environment'.[161] Kuyasa also creates jobs in installing and maintaining the solar water heaters, which are locally manufactured. Furthermore, the R625 average annual savings on electricity bills can go back into the local economy and create further economic spin-offs.[162]

One pilot project participant, Muzelli, an unemployed man in his thirties confined to a wheelchair, confirmed that he now saves over R600 per year on his electricity bills, which he is able to send back home to support his children still living in the Eastern Cape. When the weather gets cold at night (it can drop below 10 degrees Celsius during winter evenings), all of Muzelli's neighbours come over to visit, as his ceiling keeps the house much warmer than anywhere else in the neighbourhood. Though he admitted that he did not know much about climate change, Muzelli made it clear that people support the project for many reasons, namely the money they save and having warmer houses. 'This

Trusha Reddy researched the Bisasar Road project while she was an intern at the Centre for Civil Society at the University of KwaZulu-Natal and later, as a freelance journalist, Climate Care's light bulb project.

is a good project,' he stated. 'People are very impatient to get their homes upgraded; they really want this project.'[163]

Thus Kuyasa has been held up as an example of the potential of carbon trading both to fight climate change and to improve living conditions in local communities.

This has got to be the future of the carbon credit market, then.

Unfortunately not. The reality is that rather than being an example of what the CDM can deliver, Kuyasa is a testament to what it can't.

What do you mean?

The project can't survive off carbon finance. Instead, it is financed predominantly by one-off government grants, as an explicitly 'public sector project'.[164]

Project proponents estimate that carbon money can cover no more than 20 per cent of the scheme's costs, depending on the spot market price of the Certified Emissions Reductions (CERs) it sells.[165] (The first 10,000 CERs from the project were sold at 15 euros each to the UK to 'offset' jet flights and other emissions associated with the 2005 G8 summit meeting at Gleneagles, Scotland.[166] But 'very few CER purchasers will pay upfront'.[167]) SSN staff member Lester Malengis, who has worked on the scheme for two years, admits: 'This is first a project that uplifts Kuyasa, not a carbon project… . That funding is not sustainable.'[168]

Graham Erion of York University Faculty of Environmental Studies and Osgoode Hall Law School conducted research on Sasol, Bellville, Kuyasa and Bisasar Road while a visiting scholar at the University of KwaZulu-Natal's Centre for Civil Society.

The project is possible only because of generous funding from the national Department of Environmental Affairs and Tourism in Pretoria, the Western Cape provincial government, and Electricité de France (as part of their Corporate Social Responsibility campaign).[169] In addition, SSN and the city of Cape Town have donated hundreds of hours of unremunerated labour. For Richard Worthington of the South African Climate Action Network, Kuyasa has only 'got to where it got to because it's been treated as a charity case. It's been damned expensive and not at all an example of how to put a project together'.[170]

Nor, according to Emily Tyler of SouthSouthNorth, who was closely involved in the development of Kuyasa, has registration as a CDM project helped. 'The CDM actually adds little value (indeed, it adds costs) to the very sorts of projects it was designed to encourage,' Tyler wrote in a whistle-blowing editorial in February 2006. There is, she said, 'no financial value added by the CDM for the project types which most closely fit the CDM's avowed objectives.' Only by

The Voluntary Market Comes to South Africa

In 2005, after two years of being unemployed, Sibiongile Mthembu got lucky.

Mthembu, 24, a lifelong resident of Guguletu, a sprawling township 20 kilometres from Cape Town created under the apartheid era, was recruited off the street by a local energy consultancy to hand out free energy-efficient light bulbs.

The consultancy had in turn been commissioned by Climate Care, a British company, to distribute the bulbs. The idea was that they would replace the more typical and wasteful incandescent variety. After having bought the bulbs (and convinced the city of Cape Town to pay to distribute them), Climate Care was then in a position to sell the CO_2 emissions estimated to have been saved to British consumers and companies who want to 'offset' their own carbon emissions.

The neighbourhoods where Mthembu went about his 10-day temporary job were full of long-standing problems. Houses were crumbling, with faulty wiring, unpainted ceilings and damp walls. Yet at USD 150 per month, when most residents earn considerably less – many from jobs such as selling loose cigarettes and sweets – the rent exceeds what the poor can afford.

'Some people are pensioners,' explained Pat Mgengi, one resident:

'They don't even get that amount of money every month. They tried taking people out of the houses and we put them back. Even after paying the full amount asked some don't have the title deeds. We are going to court time and again. We are just trying to live like any other human being.'

In this community, the light bulbs Sibiongile Mthembu offered around would not ordinarily be on anyone's shopping list. At 15 watts, the compact fluorescent bulbs are far more energy efficient than traditional higher-wattage bulbs and last about 10 times longer. But they cost USD 2.80 each, as opposed to traditional incandescent bulbs at 50 cents, and are not sold locally.

Not surprisingly, Mthembu's bulbs had many takers. Mgengi said he accepted the four that he was offered simply because they were free. 'We just accept what they introduce to us.'

But few local people will be able to afford to buy replacements. And when asked by residents if he would come back to deliver more bulbs if any were broken, Mthembu admits, he and his fellow light bulb distributors had to lie. Of the 69 low energy bulbs reported as broken from the households surveyed by Climate Care two months after the project started, none has yet been replaced.

Climate Care argues that this project is generating real carbon savings, since it would not have gone ahead without the firm's intervention and is 'not required by legislation, not common practice (and) not financially viable without carbon funding'.

However, in the wake of electricity blackouts, power generator Eskom recently decided to provide five million free energy efficient light bulbs to low-income households, among a host of other energy-saving measures. Sibiongile Mthembu is now employed delivering Eskom's energy-efficient light bulbs to 86,000 houses in Guguletu. These are houses that Climate Care missed

out on its 10-day sojourn in Africa in 2005, and that were supposedly not going to receive such bulbs without Climate Care's money.

Among Climate Care's biggest customers for its carbon credits are British Airways and British Gas, both major contributors to climate change. British Gas has recently been in the news for pursuing legal action against Bolivia for taking a democratic decision to nationalize its oil resources. It is currently a partner in two large gas fields in the country and has eight exploration blocks that have not yet started production. British Airways, meanwhile, is busy promoting British airport expansion, ramping up its inter-city commuter flight services, and launching a budget airline to popular short-haul holiday destinations.

Yet Climate Care defends both companies as being among the 'best environmental performers'. 'The climate crisis is so urgent that we should not worry about the motivation of our clients,' the company declares in its 2004 Annual Report.

Source: Trusha Reddy, 'Blinded by the Light', *New Internationalist*, June 2006. Some names have been changed to protect sources.

bypassing the bureaucracy required for quality control at the CDM, seeking extra donor funding, and selling credits on the higher-priced voluntary market to offset emissions from corporate travel, personal lifestyle and so forth, could Kuyasa have broken even.[171]

But maybe later on the project will be able to stand on its own two feet as a commercial proposition.

That seems unlikely. In fact, a special project has had to be set up by the international Renewable Energy and Energy Efficiency Partnership to help clean energy proponents find new sources of funding for Kuyasa-like projects.[172] There has been talk about relying on community residents to cover some costs,[173] allowing manufacturers to lease solar water heaters to low-income communities,[174] and even selling Kuyasa's carbon credits several times on the voluntary 'offset' market as well as through the CDM.

But that last choice would be consumer fraud!

Yes. The more times Kuyasa sold each of its credits, the more greenhouse gas emissions elsewhere it would be licensing. If the project sold even one of its credits twice, the project's net effect on the climate would become negative even on its own carbon accounting. So this was never a serious option and is roundly rejected by SSN.

Does that mean that for the time being, Kuyasa will have to be dependent on the kindness of taxpayers and politicians?

Yes. Unfortunately, it's not as if government has no other funding priorities. Housing activist Peter van Hausen notes, for example, that there is currently a backlog of 260,000 houses that need to be built in Cape Town, and 20,000 more are required each year.[175] This backlog has almost doubled since 1994. In the long term, it is a lot to ask of public authorities that they spend tax money on energy upgrades for people who already own their homes when hundreds of thousands do not.[177]

Thus, while Kuyasa is exactly the type of project that many people hoped the CDM could deliver, now that it exists, the carbon market simply cannot support it. Carbon credit buyers will naturally gravitate towards much less environmentally and socially desirable projects such as Bisasar Road, Bellville or Sasol – assuming any of them come on line.

'The rich developed countries have emitted most of the greenhouse gases currently in the atmosphere and now the more enlightened of them are prepared to pay to further pollute our atmosphere, or more exactly, they will provide money so that they can continue their pollution while we decrease ours.'[176]

South African Climate Action Network, July 2002

Brazil – Handouts for repression as usual

In a carbon project in Minas Gerais, eastern Brazil, carbon trading institutions have used and exacerbated coercive power relations in yet another attempt to produce an imaginary carbon commodity. As in Ecuador and Uganda, the Forest Stewardship Council (FSC) has played a big role and, as in South Africa, the World Bank as well.

Is this another tree plantation project?

Partly, but it's a good deal more complicated. The company claiming to be saving carbon and helping the climate is a pig iron-producing and plantation management company called Plantar S.A.

How is Plantar helping the climate? Is the pig iron it makes produced by solar energy? Or is it perhaps used to make solar cells?

Unfortunately, no. The iron is produced by burning charcoal and releasing carbon dioxide into the atmosphere, and is actually used to make things like cars, which of course release yet more carbon dioxide.

In that case, how can Plantar claim that it deserves carbon credits? It sounds like it's an active part of the industrial system that is accelerating climate change.

Plantar and its colleagues at the World Bank have tried many lines of argument. At first, they said that without carbon finance, there would be an 'accelerated reduction in the plantation forestry base in the state of Minas Gerais, within the next decade, caused by harvesting of existing forests (now in the last cycle of their rotations) and lack of investment into replanting'.[178] In the absence of carbon finance, Plantar and the Bank insisted, 'the company would not invest in the replanting of its forests for the pig iron production, abandoning them after the final harvest of the existing plantations'.[179] When reminded that CDM rules do not allow credit to be provided for 'avoided deforestation', the Bank rewrote its design documents to emphasise other justifications.

Which were…?

First, that Plantar was not avoiding deforestation but rather preventing an otherwise necessary switch in the fuels for its pig iron operations from eucalyptus charcoal to more carbon-intensive coal or coke.

Let me get this straight. This company says it deserves carbon credits for not doing something?

That's right. Plantar claims that without carbon money, the company would switch over from using charcoal to using fossil fuel. It's called an 'avoided fuel switch'. Because the carbon dioxide released by the charcoal is supposedly mostly absorbed by the new trees grown for new charcoal, less carbon enters the atmosphere than would enter it from the burning of coal.

But why would Plantar switch over to using coal? Isn't there enough charcoal to go around?

Plantar claims that without extra carbon finance for a 23,100-hectare plantation scheme, the charcoal-fired pig iron industry would face a 'supply bottleneck'. It says current plantations are being depleted and the lack of forest incentives will render new plantations financially unfeasible without World Bank carbon financing.[180] Plantation land will be 'converted to pasture or agricultural land'.[181]

Is that true?

Well, it does somewhat strain credulity. Plantar is saying that carbon credits for its 23,100 hectare project are the only thing that can ensure charcoal supplies, even though Minas Gerais alone boasts 2 million hectares of eucalyptus plantations. Plantar itself owns rural properties covering more than 180,000 hectares, mainly devoted to eucalyptus for charcoal and almost all located in Minas Gerais,[182] and provides management services for more than 590,000 hectares of plantations for itself and other companies in Brazil spread across 11 large units.

The firm also has large investments in the development and production of high-yielding clonal eucalyptus varieties and is reported to be producing over 40 million clonal seedlings per year,[183] with yields of 35-42 cubic metres per year, contributing to its reputation as a committed, low-cost and highly competitive producer of charcoal and many other plantation timber products.[184] In addition, Plantar has recently gone to the trouble of getting plantations it uses to produce barbeque charcoal certified by the FSC.

Why should the failure to get carbon credits for only 4 per cent of the total area under the firm's management and 13 per cent of its own direct holdings result in a failure to invest in replanting? If the financial prospects for new plantation development are so poor, why did Plantar purchase the lands in question before it was considering carbon finance?

Some 143 local groups and individuals put it more strongly in a letter to the CDM Executive Board of June 2004:

> [T]he claim that without carbon credits Plantar…would have switched to coal as an energy source is absurd… Yet now [Plantar] is using this threat to claim carbon credits for continuing to do what they have been doing for decades – plant unsustainable eucalyptus plantations for charcoal… It is comparable to loggers demanding money, otherwise they will cut down trees… [The CDM] should not be allowed to be used by the tree plantation industry to help finance its unsustainable practices.[185]

Even the project's validator, Det Norske Veritas (DNV), a Norwegian 'risk management' consultancy, admitted to being sceptical about Plantar's claim that it would not invest in replanting in the absence of the CDM project, 'given Plantar S.A.'s relatively strong investment capabilities as one of the major eucalypt seedling producers in Brazil'.

How did DNV check Plantar's claim?

They simply went to Plantar and asked them if it was really true or not. Unsurprisingly, Plantar executives assured them that the 'internal

rate of return for planting new trees today is not attractive in absence of the sale of CDM credits'.

Meanwhile, the World Bank and its consultants admit that there are several possible 'land management scenarios for the Curvelo ranch in the absence of the carbon project'.[186]

That means that there are several possible baselines with different carbon profiles.

Yes.

That means that there are several different figures for how much carbon the project might save.

Yes.

That means that there can be no single number of carbon credits generated by the project.

No, there can't.

Doesn't that bother the project accountants?

No. They simply choose the baseline scenario they claim is 'most plausible' and discard the others.

So there's actually no scientific basis for assigning any particular number of carbon credits to the project?

No. It's essentially arbitrary. What's more, even if Plantar could prove that it was avoiding the use of a quantifiable amount of coal in Minas Gerais, it would still have to prove that the coal would not be used somewhere else for 10, 50, 100 or 300 years. Or it would have to quantify the extent to which its local avoidance of fossil fuels was helping indirectly to build an alternative, non-fossil energy economy worldwide. In the end, it's anybody's guess how Plantar's carbon credits are related to climate.

Revealingly, even those technocrats who are committed to the idea of carbon-saving projects are beginning to be uneasy about companies' demands to be given carbon money for what they are doing already. In January 2003, the CDM Methodologies Panel rejected the claim of another 'avoided fuel switch' carbon project located adjacent to Plantar's that it was an improvement on 'business as usual'.[187] In November 2003, the project submitted another accounting methodology. But the Panel was still unsatisfied. Could carbon-saving projects that merely continue current practice really be 'additional'? The panel decided that the claim throws up problems of 'moral hazard'.[188]

'Moral hazard'? What does that mean?

It's a term often used in the insurance business. By insuring houses, for example, an insurance company, if it's not careful, can create an incentive for its customers not to take proper precautions against fire. Similarly, offering businesses a way of getting subsidies for what they're doing already, without any way of verifying their claims about what would happen otherwise, creates incentives for them not to make any improvements.

Are there other justifications Plantar cites for getting carbon credits?

Several. Plantar has also looked to get carbon credits for afforestation; improvements in charcoal production that minimise methane releases; rehabilitating *cerrado* (savannah), the biome it itself has had such a hand in depleting; and improving grasslands.

What do local people make of all this?

They find it hard to believe that Plantar could secure extra finance for anything that falls under the rubric of 'environment' or 'development'.

'We were surprised and bewildered by the news', a group of over 50 trade unions, churches, local deputies, academics, human and land rights organisations and others protested in a letter of 26 March 2003.[189] They see the company as having illegally dispossessed many people of their land, destroyed jobs and livelihoods, dried up and polluted local water supplies, depleted soils and the biodiversity of the native *cerrado* biome, threatened the health of local people, and exploited labour under appalling conditions (see 'Plantar vs. local people – Two versions of history', on page 309).[190]

So they see the carbon scheme as shoring up an unjust and destructive social arrangement.

Yes. But local residents oppose not only the way Plantar is trying to get paid for using former *cerrado* and farmland for a carbon dump. They also oppose the way the carbon project appropriates alternative futures that they are pressing for:

> The argument that producing pig iron from charcoal is less bad than producing it from coal is a sinister strategy… What about the emissions that still happen in the pig iron industry, burning charcoal? What we really need are investments in clean energies that at the same time contribute to the cultural, social and economic well-being of local populations… We can never accept the argument that one activity is less worse [*sic*] than another one to justify the serious negative

Conducting research into the story of Plantar have been Marcelo Calazans (below) and Winnie Overbeek of the Brazilian NGO FASE-ES in Espirito Santo, assisted by an international team working on carbon trading more generally including, (next page from top) Adam Ma'anit and Heidi Bachram of Carbon Trade Watch, Jutta Kill of Sinks Watch, and Ben Pearson of Clean Development Mechanism Watch (and now with Greenpeace Australia).

> impacts that Plantar and its activities have caused… [W]e want to prevent these impacts and construct a society with an economic policy that includes every man and woman, preserving and recovering our environment.[191]

In the face of all this opposition, how does the project go forward?

The scheme probably couldn't have got off the ground without the help and sponsorship of the Prototype Carbon Fund (PCF) of the World Bank, which would feed any credits it generates to its roster of Northern corporate and government clients. Plantar was the Bank's first carbon sink project and the Bank expected it to 'prepare the ground for similar projects in the future'.[192] Plantar's carbon scheme also gains legitimacy from the involvement of the FSC, as do similar schemes in Ecuador and Uganda (see 'From the Netherlands to the Andes – A tale from Ecuador' and 'The story continues – carbon forestry in Uganda').

What if Plantar can't deliver the credits? Suppose the plantation burns down or the project verifiers find problems with the carbon accounting?

One of the buyers of Plantar's carbon credits, The Netherlands, insists that if more than 30 per cent of its credits are delivered late, Plantar will have to pay a penalty. The World Bank would get off without paying anything.

But doesn't the involvement of the World Bank, as an internationally reputable development institution, at least guarantee certain environmental standards and provide safeguards against abuse of local people?

On the contrary. Many local people feel that the Bank's involvement merely legitimises environmental damage and the intimidation that Plantar uses to control local people – intimidation which, as in Thailand, is nowhere acknowledged in carbon project documents.

Many local residents are afraid to let interviewers cite their names. Some receive death threats. When a representative of the Rural Union of Workers of Curvelo went to the climate negotiations in Milan in December 2003 to raise awareness about the negative environmental and social effects of Plantar's operations (which won a special ironic NGO award there for 'worst CDM sinks project'), the company's directors bullied other union members into signing a letter of support for the company, threatening massive layoffs if carbon credits were not forthcoming. (One longstanding union opponent of the expansion of eucalyptus plantations in Minas Gerais did manage to insert the legible notation 'under pressure' beside her signature.)

Plantar: Local People Speak

'Plantar has planted all over, even up to the Seu Zé do Buritim river spring. Thirty-five thousand hectares of land…they sprayed pesticides with a plane. There used to be deer and other animals in the area. The native fauna lived together with the cattle. But since they applied the pesticide, every one of them got killed… The eucalyptus planted over here is meant for charcoal. It is a disaster for us. They say it provides jobs, but the maximum is 600 work places in a plantation of 35,000 hectares. And, whenever everything has been planted, one has to wait for six years. So, what work does it generate? … We used to produce coffee – the Vera coffee – and pasta and cotton. Several different little factories in their suitable regions. Nowadays, there is only the eucalyptus. It has destroyed everything else… Why do they come to plant in the land suited for agriculture instead of more suitable areas? Because there it takes 10 to 20 years and over here only seven. All the best pieces of land went to the eucalyptus plantations, pushing the small producers away and destroying the municipalities… These companies don't want unions. They immediately co-opt the union leaders and they begin to make them part of their inner circle of managers and directors… The eucalyptus gives the water back to the earth after some years. But when it is time to give it back, they plant a new one that will absorb the water returned by the old one. This new plantation will develop really quickly, because, besides the rainwater, it will receive the water from the old eucalyptus…they are using the carbon credits to plant these eucalyptus that will grow very quickly.'

Local man who asked for anonymity out of fears for his safety, 2003

'Eucalyptus has been grown with blood.'

Antonio, local farmer, 2003

Unbowed, the local movement has subsequently appealed directly to European investors not to put money into the Plantar carbon project. Peasant and trade union representatives travelled to Cologne to intervene in the Carbon Expo trade fair held there in June 2004, in which the Bank participated.[193]

Throughout the disputes over the carbon project, the World Bank has taken the side of Plantar. For example, in 2003 it posted on its website a letter from Plantar to PCF investors replying to dozens of local groups, without posting the original letter to which it was a reply.

What about FSC? How are they involved?

FSC has certified only 32,232 hectares of Plantar's operations – less than 18 per cent of its landholdings.[194] These hectares are used to produce barbeque charcoal, as well as charcoal that would be used for the PCF project. However, Plantar has not hesitated to announce on its website that certification 'ensures that our forest is managed in an environmentally responsible, socially beneficial and economically viable way'. This

gives the impression that FSC's certificate is valid for all of the company's plantations. It also claims in a letter to PCF investors that '100 per cent of the Project Area is being and will be certified'.[195]

As in Ecuador, FSC thus has a hand, if only an indirect one, in producing a fictitious commodity claiming to be 'carbon'.

Photo Essay
Plantar vs. local people – Two versions of history

Demonstration in early 2005 against the 'green desert' created by commercial eucalyptus plantations established by Plantar and other companies.

Local People: Before the advent of giant eucalyptus plantations, the inhabitants of the *cerrado* (savannah) of northern Minas Gerais used the savannah for crops, cattle, wild foods, medicines and crafts. Small and medium-sized companies relied on *cerrado* products to manufacture pasta, leather, saddles, shoes, cotton oil, textiles, castor oil, textiles, sweets, and liquor and other products of the native *pequi* fruit.

Rice, beans and maize were planted and traditional dairy farming and livestock-raising was practised. Under the dictatorship, however, lands that the *geraizeiros*, or *cerrado* inhabitants, had traditionally used and claimed ownership over, but which were not formally titled and were under the jurisdiction of the state (*devolutas* lands), were leased fraudulently for 20 years to eucalyptus-planting firms, who also received financial incentives. Many rural dwellers were expelled from the land, while others were persuaded to abandon it by promises of jobs and better living conditions; still others sold up after becoming isolated and seeing their water supply dry up or become contaminated with pesticides. The *cerrado* was cut down, fields were fenced and consolidated, and agriculture, stock-raising and food products factories, which depended on the biodiversity of the *cerrado*, collapsed, leaving many unemployed. Through dispossession and impoverishment, residents have been forced to accept low wages and dangerous working conditions, often as illegal out-sourced labour, or flee to *favelas* on the outskirts of cities, where they are also trapped in a cycle of poverty.

Exactly how much of Minas Gerais' monoculture of eucalyptus plantations today is on *devolutas* lands is disputed, but the area is large. An investigative commission of the Minas Gerais parliament found that iron and steel companies were granted 'a large part of the *devolutas* lands in northern Minas Gerais'. Whatever the exact figure, however, the question must be investigated, since according to Brazilian law, corporations cannot acquire this type of land, only peasants. By right, such lands should be given back to rural dwellers and used food production, and restoration of the *cerrado*. Many *geraizeiros* have brought a case against the state over their expulsion from their land when it was expropriated and leased to the companies. They want to convert plantations back into native *cerrado*.

Plantar: Plantar has never owned nor used any so-called *devolutas* lands. It has never contributed to the eviction of indigenous peoples. Plantar has never placed any constraints on the commercialisation of *cerrado* fruits, on which a few families may rely to earn their living, or on those who collect fruits for subsistence purposes. It is very hard to imagine how a company that does not occupy more than 4.5 per cent of the Curvelo Township area could cause a crisis in the fruit-collecting economy. Besides preserving both legal reserves and permanent conservation areas, Plantar also contributes to the conservation of traditional species of the *cerrado*. Anyway, the areas where Plantar works are not economically dependent on *cerrado* products but on cattle-raising. This has heavy environmental impacts, adds little value, and creates fewer employment opportunities than are created by the forestry industry. For example, in Felixlândia, Plantar acquired

Some of Plantar's plantations from the air.

a former cattle-raising farm which did not provide more than 20 jobs. In the same area, we currently have almost 300 permanent employees. In Curvelo, Plantar provides more than 1000 direct jobs, not to mention indirect ones. Plantar has not caused massive job layoffs and has significantly expanded due to forestry management services provided to third parties.

Locals: The 4.5 per cent figure doesn't include other companies' eucalyptus plantations in Curvelo, including those of Cossisa and Vallourec & Mannesmann Florestal (a company that is also trying to get carbon credits for maintaining a plantation operation that has displaced local people). In any case, knowing that Plantar has covered 4.5 per cent of the municipality with eucalyptus does not change the plantations' impacts on the lives of people nearby. Plantar's comparison between the 20 workers on a former cattle ranch and the 300 workers working there now is misleading. No local people were in fact hired. Unemployment in Felixlândia in fact increased. In addition, while eucalyptus plantations may provide employment during the first two years – in preparation of the land, planting, pesticide application or irrigation – they provide very little work during the subsequent five years before cutting.

It's true that local people do not use *cerrado* areas under Plantar's control for fruit collection. These areas are very small and offer little. But local communities have suffered from Plantar's restrictions on their tradition of letting their cows graze freely. Plantar has put cattle in fenced areas or taken them away to another area without informing the owner. This has led to cases of lost cattle. Land reform and small-scale agriculture are the only ways of creating a future for the Brazilian rural population. Tree plantations only worsen the unequal distribution of land in the country. In Espirito Santo, eucalyptus plantations expelled thousands and thousands of people into the poor neighbourhoods of urban centres and an uncertain future. Turning over the 23,100 hectares of the Plantar project to small-scale diversified and ecological agriculture would create at least 23,100 more human-friendly jobs, with salaries at least four times higher than those of the majority of Plantar workers, according to the concrete experience of the local Movimento dos Pequenos Agricultores (Movement of Small Peasants). The Movement is also developing an alternative reforestation project, using not eucalyptus but tree species with multiple uses and local environmental value.

Harvest time on Plantar's plantations.

Locals: What with the eucalyptus industry's transformation of local rural society, people often have no livelihood options other than small-scale charcoal production, and build clay ovens in the *cerrado* for the purpose. Collecting commercial eucalyptus is against the law, however, so independent producers often burn what's left of native trees, and the resulting charcoal is often eventually purchased by the corporations. Although the companies are legally allowed to use a certain percentage of charcoal made from native *cerrado* trees as long as it comes with a certificate, they are said to pay more for native charcoal *without* the certificate. This allows them to use more than the legal amount of native charcoal. Companies still use around 15-20 per cent native charcoal.

Plantar: The use of charcoal made out of native vegetation is a reality that bothers pig iron manufacturers, environmentalists and authorities alike. That's why it's a goal of the Plantar project to establish sustainable plantations, capable of supplying 100 per cent well-managed eucalyptus plantation charcoal for pig iron manufacturing, thus curbing negative impacts brought by the use of native vegetation.

Forest clearance for Plantar plantation.

Locals: Plantar also continues to destroy *cerrado* directly in order to use the land for plantations. For instance, Plantar bought *cerrado* lands in the Campo Alegre and Paiol communities in Minas Gerais and planted eucalyptus on it. As late as 2000, Plantar was felling *cerrado* in Lagoa do Capim. In December 2002, Plantar land was also cleared at the river spring of Pindaíba. Native tree trunks can still be seen there. Dozens of municipalities have declared a state of emergency over water. Near Paiol de Cima, one stream has completely dried up after having previously flowed 11 months of the year. In Felixlândia, a spring called Cabeceira do Buriti is degraded. Flows in the Buriti river are down and herbicides have been applied without consultation

Plantar eucalyptus plantation with dead native *buriti* tree in the foreground. The *buriti* is a symbol of the *cerrado* region whose wide river basins it thrives in. The tree needs a lot of water to survive, and its demise shows that water levels have dropped.

Dried-out swamp forest near abandoned farm, October 2003.

with local people, killing fish and birds. Plantar has planted eucalyptus at river springs, drying them up and also contaminating them with pesticides that kill animal life in the streams. Plantar's contamination of local drinking water sources with pesticides has also caused the death of many emas, large land birds related to ostriches. The communities of Cobú, Paiol de Cima, Canabrava and Boa Morte have been forced to dig artesian wells. Cattle-ranching does not cause such negative impacts on water, and produces a greater diversity of goods, including meat, milk, leather and manure.

Plantar: We have been accused of drying up rivers, but in fact some streams dry up naturally for a few months, due to the seasonality of rainfall normal to the *cerrado*. They recover later. Of course, as with any fast-growing species, eucalyptus needs underground water. Nevertheless, scientific studies have shown that, as long as they are properly managed, as our plantations are, eucalyptus plantations do not reduce water supply to specific regions. Careless grazing and other traditional practices are more harmful to hydrological systems than eucalyptus plantations.

Locals: A Minas Gerais Parliamentary Investigation Commission found in 2002 that Plantar was practising illegal outsourcing of labour that negatively affected the safety and livelihoods of charcoal workers. It cited 'precarious labour relations, abominable working conditions, slave and child labour and deforestation of the *cerrado*' as well as 'infamous' wage levels. It also found problems with housing, hygiene, drinking water, food and transport, and noted that Plantar was in breach of International Labour Organisation provisions regarding freedom of trade union organising. The Federal Public Ministry of Labour has sued Plantar for illegal subcontracting and forced it

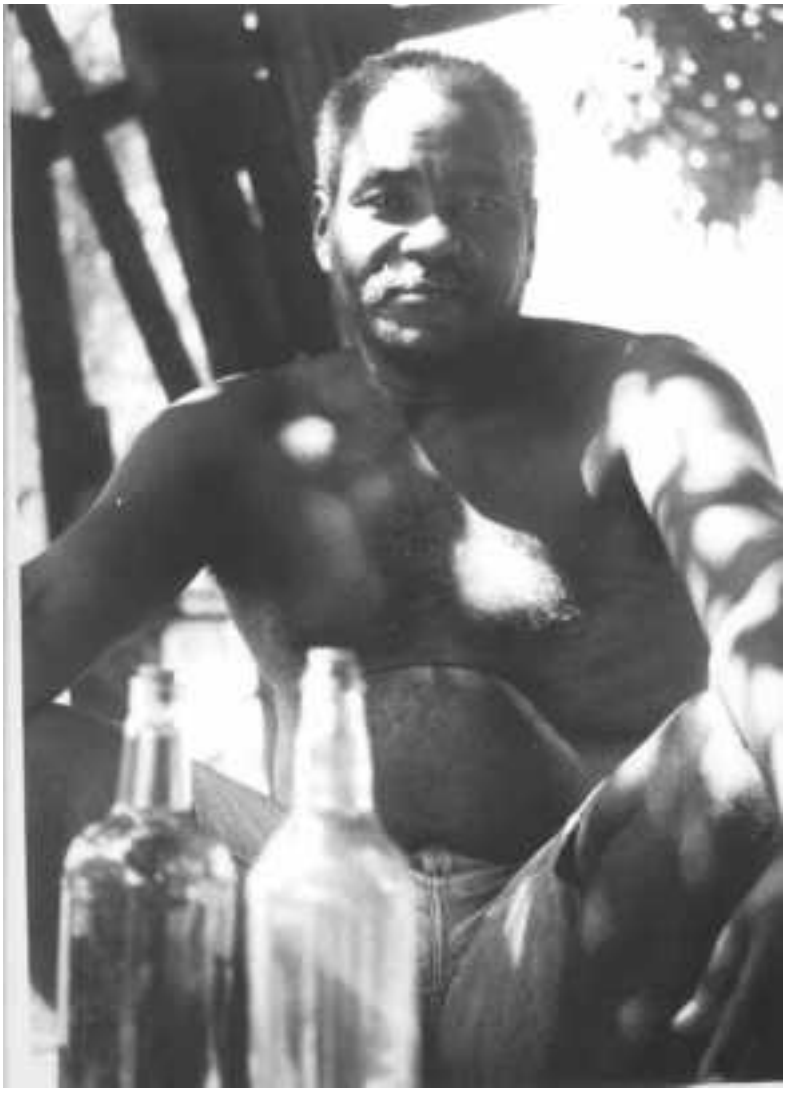
Quilombola charcoal workers. The *quilombola* are descendants of African slaves who, during the colonial era, escaped from farms to the hinterland, where they founded their own communities with their own distinctive culture, which survives today.

to sign an agreement to change its behaviour, which was subsequently found not to be in compliance. During the 1990s, the Montes Claros Pastoral Land Commission, a church-related organisation, also verified the existence of slave labour on Plantar property. In March 2002, the Curvelo Regional Labour Office (DRT) issued Plantar with a summons for using slave and child labour in timber extraction and charcoal production and fined the company after finding 194 workers without any registration on its plantations in Curvelo.[196]

Plantar charcoal ovens.

Plantar: Plantar has never used child labour or slave labour. Our working conditions are in complete accordance with labour laws. Besides complying with Forestry Stewardship Council standards, the company is frequently audited under its International Standards Organisation-certified quality management system and is certified by ABRINQ Foundation as a 'child-friendly company'. Representatives from the Intergovernmental Panel on Climate Change have visited Plantar's facilities. Plantar may have been cited over working conditions by a Parliamentary Investigation Commission (along with every other company in the sector), but no irregularities were found. The benefits provided to employees are a benchmark for the industry and include occupational health care, half scholarships for all employees from basic education to graduate degrees, and free meals and food supply kits to lower-income employees. Instead of undertaking a legal dispute with the Curvelo Regional Labour Office (DRT) after being cited over outsourcing, Plantar has already agreed to manufacture charcoal with its own workforce.

Locals: Plantar's agreement to manufacture charcoal with its own workforce needs to be evaluated to see whether it is really improving conditions for workers, who in general earn a maximum of only USD 100 a month. As unemployment is rife, most workers are frightened of mentioning any problem that occurs, including the creation of new contracting companies nominally part of Plantar with names like Plantar Energética. Plantar charcoal workers are continuously exposed to smoke containing toxic gases as well as pesticides and are at a high risk of accidents. In Espirito Santo, the Attorney General for Workers' Conditions opened a confidential investigation in



Jorge, a former Plantar worker: 'When I started working at Plantar I was OK. One day I fainted after lunch. I was already applying the insecticides, fungicides. I had headaches, I felt weak. My superior told me, "I am firing you because you don't know if you are sick or not." Six or seven people died. Plantar said it was heart failure. Now I'm unable to work. I don't dare eat the fish from the streams here.'

2001 after the death of several former Plantar workers. One, Aurino dos Santos Filho, died with a pump filled with pesticides on his back while working on a eucalyptus plantation in Espirito Santo in 2001; he was only 34 years old. Aurino's family has not received any compensation from the company. Plantar does nothing for workers who become disabled as a result of their work for the company; many have already died. Plantar makes labour organising difficult by rotating workers among far-flung sites. Worker leaders are registered as 'urban labourers' to prevent them from becoming rural union members.

Quilombola charcoal worker.

Locals: When it built a new tree nursery, Plantar, without consulting local inhabitants, diverted a road that has always been used by the communities of Paiol de Cima, Meleiros, Cachoeira do Choro, Paiol de Baixo, Canabrava, Gomos and others, extending travel distances for local inhabitants, including 900 students from the Serfio Eugenio School, by more than five kilometres. Plantar also dammed up the local Boa Morte river to supply the nursery with water, as well as polluting water with fertilisers and other agrochemicals, causing complaints from downstream water users.

Most of the photographs and information in this section are courtesy of Tamra Gilbertson of Carbon Trade Watch and form part of an international exhibition developed by her on the Plantar case.

Plantar: The detour has not caused any damage to local people. The original route is still there and can be used by pedestrians, cyclists and horse riders. Vehicle traffic has been diverted to prevent seedlings from being affected by dust, and drivers prefer to take the detour anyway because the road is of better quality. Public and school buses no longer get stuck in the mud during rainy periods.

Locals: In 2003, the old road was fenced off, making it impossible even for pedestrians to use. Even for anyone daring to jump the fence, the road is unusable, since it is blocked by the company's nursery. School buses never had problems with the old road.

With the help of Carbon Trade Watch, different generations (above and below) learn how to film their struggle to share with outsiders, including communities near a BP refinery in Scotland. The carbon credits BP obtained from Plantar and other carbon projects would allow it to maintain high levels of fossil fuel pollution in Europe.

1 Freeman J. Dyson, 'Can We Control Carbon Dioxide in the Atmosphere?', *Energy* 2, 1977, pp. 287-291.

2 Paul Faeth *et al.*, *Evaluating the Carbon Sequestration Benefits of Forestry Projects in Developing Countries*, World Resources Institute/EPA, Washington, 1994; Sandra Brown *et al.*, *Carbon Sequestration Final Evaluation: Final Report to CARE Guatemala for PNO3 Agroforestry Project*, Winrock International, Arlington, VA, 1999. The project also featured the first ever 'additionality' analysis; that is, an analysis that claimed the project deserved carbon credits because it would not have happened without the sponsoring corporation's concern about climate change. See Mark Trexler *et al.*, 'Forestry as a Global Warming Mitigation Strategy: An Analysis of the Guatemala Carbon Sequestration Forestry Project', World Resources Institute, Washington, 1989.

3 See www.careusa.org/careswork/project.asp.

4 *World Rainforest Movement Bulletin* No. 37, August 2000, available at www.wrm.org.uy/bulletin/37/Camerica.html; and www.careusa.org/careswork/project.asp. Guatemala Agroforestry estimates 100 tonnes of carbon sequestered per hectare for forests and 30 tonnes for regrowth.

5 Brown *et al.*, *op. cit. supra* note 2.

6 World Bank, *Guatemala – Integrated Management of Natural Resources in the Western Altiplano (MIRNA). Project Appraisal Document*, World Bank, Washington, 2001.

7 Larry Lohmann, 'Democracy or Carbocracy? Intellectual Corruption and the Future of the Climate Debate', Corner House Briefing No. 24, 2001, pp. 36-44, http://www.thecornerhouse.org.uk.

8 Brown *et al.*, *op. cit. supra* note 2.

9 Verónica Vidal, *La Aplicacion de Politicas sobre Cambio Climatico en el Sector Forestal del Ecuador*, Memoria de Investigación Doctorado en Gestión Ambiental y Economía Ecológica, Autonomous University of Barcelona, October 1999.

10 Since 1994, PROFAFOR has arranged forestation contracts in the provinces of the Ecuadorian Sierra: Imbabura, Pichincha, Chimborazo, Cañar, Azuay and Loja. It has also signed contracts in coastal provinces, in the buffer zone of the Mache-Chindul Ecological Reserve within the polygon formed by El Carmen, Pedernales, Cojimíes, Muisne, Atacames, Bilsa and Quinindé – that is to say, in the north of the province of Manabi and in the south of the province of Esmeraldas.

11 Robert Hofstede, 'Impactos Ecológicos de Plantaciones Forestales', in Robert Hofstede *et al.*, *Geografía, Ecología y Forestación de la Sierra Alta del Ecuador: Revisión de Literatura,* Editorial Abya Yala, Ecuador, 1998. See also Robert Hofstede, La Importancia Hídrica Del Páramo y Aspectos de Su Manejo, EcoPar, August 1997.

12 Vidal, *op. cit. supra* note 9.

13 G. Medina *et al.*, 'El Páramo como Espacio de Mitigación de Carbono Atmosférico, Serie Páramo, 1', GTP/Abya Yala, Quito, 1999, quoted in Veronica Vidal, 'Impactos de la Aplicación de Políticas sobre Cambio Climático en la Forestación del Páramo de Ecuador', *Ecología Política*, No. 18, 1999, pp. 49-54.

14 See http://www.stichtingface.nl.

15 *Ibid.*

16 See also C. Borga *et al.*, *Plantas Nativas para Reforestación en el Ecuador*, Fundación Natura, Quito, 1980.

17 See http://www.stichtingface.nl.

18 Mary Milne, 'Transaction Costs of Forest Carbon Projects', Center for International Forestry Research, available at http://www.une.edu.au/febl/Economics/carbon/CC05.PDF.

19 Montserrat Alban and Maria Arguello, *Un Análisis de los Impactos Sociales y Económicos de los Proyectos de Fijación de Carbono en el Ecuador: El Caso de PROFAFOR-FACE*, International Institute for Environment and Development, London, 2004.

20 The agreement was signed using as a reference a document from the property registry and some false title deeds.

21 Harald Eraker, 'CO_2Ionialism: Norwegian Tree Plantations, Carbon Credits and Land Conflicts in Uganda', NorWatch/The Future in Our Hands, Oslo, 2000.

22 NORAD, letter to NorWatch, 30 March 2000.

23 Trygve Refsdal in telephone conversation with Harald Eraker, March 2000.

24 *Ibid.*

25 B. Koppers, *Social Impact Assessment of the Proposed Natural Forest Resources Management and Conservation Program*, K Consult, Oslo, October 1999.

26 D. N. Byarugaba, Commissioner for Forestry, 'Utilisation of Bukaleba Forest Reserve', 25 January 2000. An MP, Bunya West, wrote an open letter dated the same day which reacted harshly to a proposed solution for the land conflict put forward by a parliamentarian from the district on behalf of Norwegian and German concessionaires. The proposal entailed that while those only engaged in fisheries could keep a landing site for fishing boats, other intruders had to leave the reserve by the end of July that year.

27 John R. W. Aluma, 'Report on Environment Impact Assessment of the Management Plan for Bukaleba Forest Reserve under Busoga Forestry Company Limited', consultant's report, September 1999.

28 The company's environmental impact assessment, too, has noted the fears of local people: 'The [local] communities have expressed very strong desire to be permitted to continue to stay there [in the reserve] as it would be extremely difficult to find alternative locations and activities for livelihoods.' Yet the summary of the impact assessment states that the farmers and fishermen 'consider the project as a positive socio-economic development' for the area. *Ibid.*

29 Koppers, *op. cit supra* note 25.

30 Nsita Steve Amooti, Forest Officer, 'Field Visit to Bukaleba Forest Reserve', 24 November 1999.

31 According to one report, farmers must also pay a cash rent ranging from 10,000 to 85,000 Ugandan shillings per hectare, at a time when Tree Farms is only paying 5,000 shillings per year to the authorities for every hectare planted with trees. *Ibid.*

32 Koppers, *op. cit supra* note 25.

33 Amooti, *op. cit. supra* note 30.

34 Odd Ivar Løvhaugen, email to Harald Eraker, 20 January 2000.

35 Intergovernmental Panel on Climate Change, *Special Report: Land Use, Land-Use Change, and Forestry, Draft Summary for Policymakers*, Oxford, Oxford University Press, 2000.

36 Koppers, *op. cit supra* note 25.

37 Trygve Refsdal, email to Harald Eraker, 24 March 2000.

38 As noted in the previous section, FACE Foundation (Forests Absorbing Carbon-Dioxide Emissions) contributes financially to the 'reforestation' of about 150,000 hectares worldwide. FACE is an initiative of the Dutch Electricity Generation Board.

39 According to a Societé Générale de Surveillance (SGS) assessment report done in 2001, the project is expected to result in an increase in the average storage capacity of 3.73 million tonnes of carbon dioxide over its 99-year lifespan. SGS is the world's largest inspection, verification and testing organisation.

40 *New Vision*, Monday, 15 April 2002. *New Vision* is Uganda's leading daily newspaper.

41 Chris Lang, 'Uganda: Face Foundation, Carbon Conflict and FSC Certification', *World Rainforest Movement Bulletin* 101, December 2005, www.wrm.org.uy.

42 *New Vision*, 30 June 2004.

43 Miriam van Heist, *Land Unit Map of Mount Elgon National Park*, IUCN technical report, Gland, unpublished, 1994.

44 Lang, *op. cit supra* note 41.

45 Axel P. Gosseries, 'The Legal Architecture of Joint Implementation: What Do We Learn from the Pilot Phase?' *New York University Environmental Law Journal* 7, 1999, pp. 99-100.

46 Michael Dutschke and Axel Michaelowa, 'Joint Implementation as a Development Policy – The Case of Costa Rica', HWWA Discussion Paper No. 49, 1997.

47 M. Alfaro *et al.*, 'Evaluación del Sector Forestal de Costa Rica para la Mitigación del Cambio Climático en el Marco del MDL: Informe Final', Proyecto Bosques y Cambio Climático en América Central, Organización de las Naciones Unidas para la Agricultura y la Alimentación (FAO), Comisión Centroamericana de Ambiente y Desarrollo (CCAD), San José, Costa Rica, 2003.

48 'The Marrakesh Accords and the Marrakesh Resolution', www.unfccc.int/cop7/documents/accords_draft.pdf.

49 Alfaro *et al.*, *op. cit supra* note 47.

50 *Ibid.*

51 At present most of the timber consumed by the country comes from wooded grasslands. For example, in the year 2001 alone, approximately 260,000 cubic metres of timber were legally extracted from some 170,000 hectares of wooded grasslands, amounting to 3 per cent of the national territory (*Estado de la Nación*, San Jose, 2003).

52 See Paul Harremoës *et al.*, *The Precautionary Principle in the 20th Century: Late Lessons from Early Warnings*, Earthscan, London, 2002.

53 See, for example, P. B. Reich *et al.*, 'Nitrogen Limitation Constrains Sustainability of Ecosystem Response to CO_2,', *Nature* 440, 13 April 2006, pp. 922-925; D. A. Stainforth *et al.*, 'Uncertainty in Predictions of the Climate Response to Rising Levels of Greenhouse Gases', *Nature* 433, 27 January 2005, pp.403-07; W. Knorr *et al.*, 'Long-Term Sensitivity of Soil Carbon Turnover to Warming', *Nature* 433, 20 January 2005, pp. 298–302; D. Read *et al.*, *The Role of Land Carbon Sinks in Mitigating Global Climate Change*, Royal Society, London, 2001; R. Gill *et al.*, 'Nonlinear Grassland Responses to Past and Future Atmospheric CO_2,', *Nature* 417, 16 May 2002, pp. 279–283; J. G. Canadell *et al.*, 'Quantifying, Understanding and Managing the Carbon Cycle in the Next Decades', *Climatic Change* 67, 2–3, 2004, pp. 147–160; R. A. Houghton, 'Counting Terrestrial Sources and Sinks of Carbon', *Climatic Change* 48, 200, pp. 525-534; Y. Pan *et al.*, 'New Estimates of

Carbon Storage and Sequestration in China's Forests: Effects of Age-Class and Method on Inventory-Based Carbon Estimation', *Climatic Change* 67, Nos. 2-3, 2004, pp. 211-236.

54 Stephen J. Pyne, 'Fire Planet: The Politics and Culture of Combustion', Corner House Briefing, Sturminster Newton, UK, 1999, www.thecornerhouse.org.uk.

55 See http://www.fern.org/campaign_area.html?id=6.

56 L. Y. Pedroni and B. Locatelli, 'Contabilidad de créditos para carbono forestal: métodos e implicaciones. Análisis de Opciones del Mecanismo para un Desarrollo Limpio', submitted to the MINAE-OCIC Workshop, January 2002.

57 Quoted in Cathleen Fogel, 'Biotic Carbon Sequestration and the Kyoto Protocol: the Construction of Global Knowledge by the Intergovernmental Panel on Climate Change', *International Environmental Agreements* 5, 2, 2005, pp. 191-210.

58 Larry Lohmann, 'Carbon Con? Group Charges "Intellectual Corruption" over Global Warming Proposal', *Multinational Monitor*, September 2000, p. 26.

59 Open email, 21 April 2005.

60 Gregg Marland *et al.*, 'Accounting for Sequestered Carbon: The Question of Permanence', *Environmental Science and Policy* 4, 2001, pp. 259-268; Michael Dutschke, 'Fractions of Permanence – Squaring the Cycle of Sink Carbon Accounting', *Mitigation and Adaptation Strategies for Global Change* 7, 2002, pp. 381-402.

61 See http://www.rainforestcredits.org.

62 China, Korea, Chile, Mexico, Viet Nam and Argentina are also prominent. See http://www.cdm.unfccc.int for up-to-date figures on CDM projects.

63 'Doubts Raised over Some Indian CDM Projects', *Point Carbon*, 10 January 2006. Tracking CDM projects in India is extremely difficult. Though India has set up a National CDM Authority (NCDMA), with a dedicated website, and NGOs such as the Tata Energy Research Institute (TERI) and Germany's Gesellschaft fur Technische Zusammenarbeit (GTZ) offer India-specific data, information on CDM projects remains partial and inadequate. It is difficult to determine which project is selling what amount of credits to whom, and to find other relevant market information. Even the number of projects in the pipeline is difficult to ascertain. Validators' websites and the UNFCCC's list of projects being validated reveal names of CDM projects in India that are not on the NCDMA list. The fact that CDM projects in India do not require environmental impact assessments or management plans makes them all the more difficult to monitor and assess. Most surveys of CDM in India are carried out by supporters such as the NCDMA, the Asian Development Bank, and NGOs such as TERI, GTZ, or Japan's Institute for Global Environmental Strategies, and as a rule do not go beyond explaining business opportunities afforded by the CDM. There is little journalistic coverage of the physical performance of CDM projects and how they affect communities, and no systematic critique.

64 Anna Pinto, Centre for Organisation, Research and Education, 'Carbon Sinks, Carbon Trade, CDM and the Indigenous Peoples of the Northeast Region of India', draft, Guwahati, 2006.

65 Institute for Global Environmental Strategies; Ministry of the Environment, Japan; and Winrock International, India, *CDM Country Guide for India*, Second Edition, Tokyo, 2005, p. 43.

66 Soumitra Ghosh and Hadida Yasmin, 'Trade in Climate: The Saga of CDM, India Style', draft paper, Siliguri, 2006. This paper is part of a forthcoming *Report on CDM Projects* in India by Soumitra Ghosh, Devjeet Nandi, Nabo Dutta, Hadida Yasmin and Arindam Das.

67 Ritu Gupta, Shams Kazi, and Julian Cheatle, 'Carbon Rush', *Down to Earth*, Centre for Science and Environment, 15 November 2005.

68 *Ibid.*

69 *Ibid.*

70 Natuur en Milieu, 'The Future of the Clean Development Mechanism', Proceedings of the Renewable Solutions Conference, Montreal, 1-2 December 2005; see http://www.natuurenmilieu.nl/page.php?pageID=76&itemID=1596&themaID=7.

71 *Ibid.*

72 Gupta *et al.*, *supra* note 67.

73 Information on the sponge iron industry and CDM in this and succeeding paragraphs is drawn from Ghosh *et al.*, *Report on CDM Projects*, forthcoming (see *supra* note 66).

74 Minister for Forests and Environment Ganishram Bhagat, response to a question raised by MLA Nobel Verma in the Vidhan Sabha, 2 March 2005.

75 In a written reply to a question from MLA Dharamjit Singh, the State Minister for Forests, Environment and Housing informed the Vidhan Sabha on 24 February 2006 that in the Dharsinva Block of Raipur district, crops in 4,611 hectares of land belonging to the farmers of 17 villages had been severely damaged due to pollution spread by sponge iron plants. Crops have also been damaged in Kesla, Bodri, Chakarbhata, Dagori and Silphari villages of Bilha Block in Bilaspur district.

76 General Manager, District Trade and Industry Centre, Raigarh, 2005.

77 Gupta *et al.*, *op. cit. supra* note 67.

78 Ghosh *et al.*, *Report on CDM Projects*, *op. cit. supra* note 66.

79 Two researchers using software developed at the World Resources Institute in Washington estimated that as much as a staggering 7 billion tonnes worth of carbon credits could be sequestered by Indian plantations between 2000 and 2050 (Suruchai Bhadwal and Roma Singh, 'Carbon Sequestration Estimates for Forestry Options under Different Land Use Scenarios in India', *Current Science* 83, 11, 2002, pp. 1380-1386, http://www.ias.ac.in/currsci/dec102002/1380.pdf, p. 1380). A Planning Commission document has projected a vastly lower figure of 5 million tonnes of carbon dioxide saved a year, netting India about USD 125 million during the Kyoto Protocol's first commitment period (Planning Commission of India, *National Action Plan for Operationalising Clean Development Mechanism in India*, New Delhi, 2003, http://planningcommission.nic.in/reports/genrep/fin_CDM.pdf, p. 97). The fact that these two figures differ by a factor of 28 reflects the delirium that characterises the theory of carbon plantation 'offsets' (see Chapter 3).

80 Since 1992, the Indian pulp and paper industry has been trying to lease 'degraded' state forests to establish private plantations in order to meet the growing demand for raw materials. In 1994, when the Indian government tried to pass a law making this transformation possible, it faced stiff resistance from not only community groups and NGOs, but also the Planning Commission, which set up an expert committee to look into the matter. The committee categorically refuted the industry claim that degraded lands do not support biodiversity and are not used by local communities. It went on to show that leasing out of forests to industries would prove to be both ecologically and socially harmful, and would be an injustice to communities, who use all forests for livelihood and other reasons, and that no forests in the country could be said to be 'absolutely degraded' (N. C. Saxena *et al.*, *Report on the Prospects of Making Degraded Forests Available to Private Entrepreneurs*, Planning Commission of India, New Delhi, 1999).

81 Ghosh *et al.*, *Report on CDM Projects*, *op. cit. supra* note 66.

82 See http://www.communityforestryinternational.org.

83 See, for example, Irshad A. Khan, 'Joint Forest Management: Most Significant Forest Sector Policy Reform of Twentieth Century', note, World Bank, New Delhi, 2003.

84 Nandini Sundar *et al.*, *Branching Out: Joint Forest Management in India*, Oxford University Press, New Delhi, 2001; Arvind Khare *et al.*, 'Joint Forest Management: Policy, Practice and Prospects: India Country Study', International Institute for Environment and Development, London, 2000; Dermot Shields *et al.*, 'Incentives for Joint Forest Management in India: Analytical Methods and Case Studies', World Bank Technical Paper No. 394, Washington, 1998; Shashi Kant *et al.*, 'Complementarity of Institutions – a Prerequisite for the Success of Joint Forest Management: A Comparative Case of Four Villages in India', World Bank, Washington, 2002.

85 K. Sivaramakrishnan, 'Modern Forestry: Trees and Development Spaces in West Bengal', in Laura Rival, ed., *The Social Life of Trees: Anthropological Perspectives on Tree Symbolism*, Berg, Oxford, pp. 273-96.

86 Mark Poffenberger *et al.*, 'Communities and Climate Change: The Clean Development Mechanism and Village-based Forest Restoration in Central India', Community Forestry International and Indian Institute of Forest Management, Santa Barbara, 2001, p. 71, http://www.communityforestryinternational.org/publications/research_reports/harda_report_with_maps.pdf.

87 See M. Sarin *et al.*, 'Devolution as a Threat to Democratic Decision-making in Forestry? Findings from Three States in India, Overseas Development Institute, ODI Working Paper No. 19, 2003, http://www.odi.org.uk and G. Brahmane *et al.*, 'The Adivasis and the World Bank-Aided Madhya Pradesh Forestry Project: A Case Study of Indigenous Experience', discussion document prepared for the Workshop on Indigenous Peoples, Forests and the World Bank: Policies and Practice, 9-10 May 2000, Washington DC, http://www.forestpeoples.org.

88 Shramik Adivasi Sanghathan, 'Village Forest Protection Committees in Madhya Pradesh: An Update and Critical Evaluation', 2004, available from http://www.forestpeoples.org. See also N. Kumar, 'All is Not Green with JFM in India', *Forests, Trees and People*, No. 42, June 2000, pp. 46-50, and A. Roychaudhury, 'The Woods are Lovely...', *Down to Earth* 17, 1995, pp. 25-30.

89 'Report of the Joint Mission on Madhya Pradesh Forestry Project', May 1999; Samata, 'Impact of JFM in North Coastal Andhra Pradesh – A People's Perspective', Samata and CRY-Net, Hyderabad, 2000; and M. Sarin *et al.*, 'Devolution as a Threat to Democratic Decision-making in Forestry? Findings from Three States in India (Orissa, Madhya Pradesh, Uttarakhand)', Overseas Development Institute, Working Paper No. 197, ODI, London, 2003, pp. 33, 35, 49-50, 56, 57, 61.

90 G. Brahmane *et al*, *op. cit. supra* note 87.

91 Inhabitants of so-called forest villages lack land title deeds (*pattas*) and are classified as 'encroachers' on state forest land.

92 For further information on the current situation regarding JFM in Madhya Pradesh, see Shramik Adivasi Sanghathan, *op. cit. supra* note 88.

93 K. Sivaramakrishnan, *op. cit. supra* note 85.

94 Stephen Bass *et al.*, 'Rural Livelihoods and Carbon Management', Natural Resources Issues Paper No. 1, International Institute for Environment and Development, London, 2000, http://www.iied.org, pp. 4-5.

95 See, for example, C. K. Janu, 'The South Indian Adivasi Experience in the Nagar Hole National Park and Muthanga Wildlife Sanctuary', speech at the World Parks Congress, Durban, South Africa, 8-18 September 2003, available at http://www.forestpeoples.org/Briefings/Indigenous%20Rights/wpc_india_nagarahole_eng.htm.

96 Marrakesh Accords and the Marrakesh Declaration, Bonn, 2001, http://unfccc.int/cop7/accords_draft.pdf, Annex (A) 1. (c).

97 For example, Global Environment Fund, 'Conservation of Transboundary Biodiversity in the Minkébé-Odzala-Dja Inter-zone in Gabon, Congo, and Cameroon: Project Brief', World Bank, Washington, 2004, http://www.gefonline.org/projectDetails.cfm?projID=1095.

98 See Stephen Bass *et al.*, *op. cit. supra* note 94.

99 'Doubts Raised over Some Indian CDM Projects', *Point Carbon, op. cit.*, *supra* note 63.

100 This is an example of a non-CDM carbon trading project. The project bypassed government and the CDM Executive Board and was implemented between two private entities. It was thus not subject to any legal requirements involving registration, monitoring or verification.

101 'Consulting Firms Deny Wrongdoing in Drafting Indian PDDs', *Point Carbon*, 11 November 2005, http://www.pointcarbon.com.

102 Ghosh *et al.*, *Report on CDM Projects*, *supra* note 66.

103 US Environmental Protection Agency, *Inside the Greenhouse*, EPA, Washington, 1997, www.epa.gov/globalwarming/greenhouse/greenhouse2/oregon.html. Solar-home systems are purchased on credit. SELCO was to use money from Klamath Falls to purchase stock. It would then be reimbursed by estate management using deductions from project participants' monthly salaries.

104 SELCO, a Maryland-based firm with offices in Bangalore, Colombo and Ho Chi Minh City, was established in 1997. Its Sri Lankan branch folded in 2005.

105 Solar-industry analysts believe that the Sri Lankan market for solar-home systems is at least one million households, not including the war-torn provinces of the north and east. (Personal communication, Mr Pradeep Jayawardene, Shell Renewables Lanka Ltd. At the time of an interview with Cynthia Caron, this number did not include the war-torn provinces in the north and east where ethnic conflict has created economic instability and uncertainty for Sri Lanka's business community. With the 2002 ceasefire agreement between the Government of Sri Lanka and the Liberation Tigers of Tamil Eelam (LTTE), the solar market might open up in the LTTE-dominated provinces in the island's north and east.) As of August 2002, about 30,000 systems had been installed island-wide, 20,000 with support from the World Bank's Energy Services Delivery Project. (Lalith Gunaratne, email correspondence 12 August 2002.) For more on the difficulties of financing solar-home systems for rural electrification, see Cynthia Caron, 'Examining Alternatives: The Energy Services Delivery Project in Sri Lanka', *Energy for Sustainable Development* 6, 1, 2002, pp. 37-45.

106 SELCO, 'Developing Countries Receive Solar Funding from Oregon's Klamath Cogeneration Project Carbon Offset Portfolio.' SELCO Press Release No. 4, 13 September 1999. Each lamp emits about 0.10355 tons of carbon dioxide per year.

107 J. T. Roberts and P. E. Grimes, 'World System Theory and the Environment: Toward a New Synthesis', in R. E. Dunlap *et al.* (eds), *Sociological Theory and the Environment: Classical Foundations, Contemporary Insights*, Rowman and Littlefield, Lanham, 2002, p. 184.

108 Due to the country's ethnic conflict, areas of the north and east also have large off-grid populations (80-100 per cent). Either the grid has been destroyed or the affected areas are under rebel control. In 1999-2000, the government and the private sector were unable to undertake infrastructure development activities in this region.

109 At the same time (1999), the country's overall literacy rate was close to 92 per cent. Estate education is understaffed. In 1999, the national teacher-student ratio was 1:22, while in the plantation sector it was 1:45.

110 From a study conducted by the Plantation Housing and Social Welfare Trust.

111 A. W. Little, *Labouring to Learn: Towards a Political Economy of Plantations, People, and Education in Sri Lanka*, St. Martin's Press, New York, 1999.

112 Some families already used a car battery to power television sets.

113 Personal interview with Cynthia Caron, 18 August 2000.

114 Five days at Rs. 122.15 (USD 1.58), or USD 7.90.

115 There were three cadres of employment on the estate: resident-permanent (from the estate lines), non-resident permanent (from nearby villages), and temporary-casual.

116 Many workers already had loans to upgrade their existing housing. Estate management took monthly deductions from the wages of workers who had housing loans administered by the Plantation Housing and Social Welfare Trust (PHSWT). Under the PHSWT housing-loan scheme, 'at least one family member of each family will be required to work on the plantation during the 15-year lease period', according to the trust itself. The only source of funding available to workers to improve their living conditions has been through loans that keep them tied to the unfair labour practices and dismal living conditions of estate life.

117 Figures are from the Plantation Housing and Social Welfare Trust.

118 While there are no studies that show a direct correlation between concentrations of off-grid technologies such as solar power and decisions not to extend the grid into those areas (Lalith Gunaratne, email communication with Cynthia Caron, 12 August 2002), the fear that off-grid electrification could keep an entire area permanently off-grid was very real for adjacent residents. Solar-home systems generate between 35 and 50 watts of power, enough to meet requirements for domestic lighting and electronic entertainment such as TV and radio. The relative low generation capacity of solar home systems does not appear to enable equitable opportunities for economic development in off-grid areas.

119 Caron, *op. cit. supra* note 105.

120 Sonja Boehmer-Christiansen, 'Science, Equity and the War against Carbon', *Science, Technology and Human Values* 28, 1, 2003, p. 82.

121 Paul Faeth *et al.*, *op. cit. supra* note 2.

122 J-Power Group, 'FY 2005 Group Management Plan', FY2005-2007, Presentation Materials, J-Power, Tokyo, 5 April 2005.

123 Electric Power Company Development (EPCD), 'Project Design Document for a Rubber Wood Residue Power Plant in Yala, Thailand', Tokyo, EPCD, August 2002.

124 J-Power, *op. cit. supra* note 122, p. 26.

125 *Ibid.*, p. 15.

126 Food and Agriculture Organization, Regional Wood Energy Development Programme *Options for Dendropower in Asia: Report on the Expert Consultation*, Manila, 1-3 April 1998, FAO, Bangkok, 2000.

127 Global Environment Facility, *Project Brief* for project THA/99/G31, World Bank, Washington, DC, 1999.

128 United Nations Industrial Development Organization, *Thailand: Case Study, Capacity Mobilization to Enable Industrial Projects under the Clean Development Mechanism*, Vienna, 2002; Electric Power Company Development, *op. cit.*

129 EPCD, *op. cit. supra* note 123, p. 29.

130 Mitsubishi Securities, *AT Biopower Rice Husk Power Project*, 2003, http://cdm.unfccc.int/EB/Panels/meth.

131 Einar Telnes, DNV, personal communication with Larry Lohmann, 30 May 2002.

132 Jane Ellis, 'Evaluating Experience with Electricity-Generating GHG Mitigation Projects', OECD Environmental Directorate, IEA, COM/ ENV/ EPOC/IEA/SLT(2003) 8, Paris, 2003.

133 Einar Telnes, DNV, personal communication with Larry Lohmann, 27 November 2002.

134 EPCD, *op. cit. supra* note 123.

135 Lindsay Strachan, personal interview with Trusha Reddy, 13 June 2005.

136 Trusha Reddy, 'Facing a Double Challenge', University of KwaZulu-Natal Centre for Civil Society, Durban, 2005, http://www.carbontradewatch.org.

137 Lindsay Strachan, interview with Trusha Reddy, 13 June 2005.

138 World Bank Prototype Carbon Fund, *Durban, South Africa: Landfill Gas to Electricity,* Project Design Document, Final Draft, World Bank, Washington, January 2003.

139 Reddy, *op. cit. supra* note 136.

140 Carbon Trade Watch, *The Sky's Not the Limit: The Emerging Emissions Trading Markets*, Transnational Institute, Amsterdam, 2002, http://www.carbontradewatch.org.

141 Reddy, *op. cit. supra* note 136.

142 Prototype Carbon Fund, 'Durban Gas to Electricity Project – Project Design Document', July 2004, http://carbonfinance.org/pcf/Router.cfm?Page=Projects&ProjectID=3132#DocsList, p. 8. Lindsay Strachan acknowledges that closure of the dump would lead to a 12.5 per cent reduction in methane production (Tom Robbins, 'Durban Signs SA's First Carbon Finance Deal', *Business Day*, 13 November 2002).

143 Raj Patel, Centre for Civil Society, University of KwaZulu-Natal, personal communication with Larry Lohmann, 4 May 2005.

144 Raj Patel, personal communication with Larry Lohmann, 12 January 2006.

145 Sasol, 'Project Identification Note: Sasol Natural Gas Conversion Project', submitted to the Designated National Authority, South Africa, 31 January 2005, p. 4.

146 *Ibid.,* p. 5.

147 *Ibid.*

148 *Ibid.*

149 Peter Geef, Presentation to South Africa National Energy Association, Sandton, South Africa, 21 June 2005.

150 Richard Worthington, personal interview with Graham Erion, 20 June 2005.

151 SouthSouthNorth, 'Project Design Document: Bellville South Landfill Gas Recovery and Use Project', n.d.www.southsouthnorth.org; 'Bellville Landfill Gas Recovery and Use Project', http://southsouthnorth.org/country_project_details.asp?country_id=5&project_id=72&project_type=1.

152 *Ibid.*

153 City of Cape Town, 'Cape Town Integrated Waste Management Plan', www.capetown.gov.za.

154 Walter Loots, interview with Graham Erion, 14 July 2005.

155 BASE, 'Gold Standard Backgrounder', www.cdmgoldstandard.org, p. 1.

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Chapter 5
Ways forward

In which the claim that 'there is no alternative' to carbon trading is dissected and set aside, and emerging alliances for a more democratic and effective climate politics are explored.

This special report has argued that the carbon market is getting in the way of solutions to the climate crisis.

Yet many environmentalists – especially in the North – say that carbon trading is unavoidable. Citing the Kyoto Protocol, the EU ETS and other trading schemes, they argue that, like it or not, it's impossible to imagine any future national or international climate regime that does not include carbon markets. 'The only policy measures with teeth involve cap and trade', goes one often-heard refrain. 'And the only way of overcoming US opposition to climate action is through carbon trading; to criticise carbon markets is to play into the hands of George W. Bush and the oil companies.'

There's no time to start all over again, many environmentalists add, so the best we can do is roll up our sleeves and pitch in to try to make carbon trading a little less unworkable, a little less counterproductive and a little less unfair than it would be otherwise.

I can see you think this is the counsel of despair. But what's the alternative?

That's a question that's often asked – again, especially in the North. Let's start by trying to appreciate what a very strange question it is.

Pollution trading is a completely new idea, recently pushed on the world by a small circle of neoliberal institutions in the US. (The quarrel between George W. Bush and carbon trading advocates such as the framers of the Kyoto Protocol is in part merely a friendly dispute between two overlapping factions of US business.) Pollution trading's main appeal is that it promises to save money for the rich over the short term. As a pollution control policy, it has a bad to indifferent record in the very few places it's been tried, and is sure to fail elsewhere if the pollutant involved is that slippery, ubiquitous compound called carbon dioxide.

By contrast, many so-called 'alternative' approaches are of extremely long standing, have a range of beneficial effects, and have a prior

record of some success across a range of societies and issues. Most striking of all, many are already being widely used.

That raises the question: why should anyone use the word 'alternative' to refer to these approaches, while speaking as if carbon trading were a 'mainstream' strategy? Carbon trading is not, in fact, part of most climate policy proposals. It is not what people are mainly relying on in their efforts to tackle climate change. It's not the only initiative that has teeth and not 'what we have to work with'. On the contrary, it's a dubious sideshow that's wasted a great deal of time because it's been treated as a main event. It may appeal to Northern advisers at international financial institutions under pressure to offer single 'silver bullet' solutions to global problems.[1] But it's not working, and clearing it out of the way would be one good first step towards more constructive action.

I'm confused. Could you give some examples of the more established and successful strategies you're talking about?

Well, you could start with a package of approaches that's currently getting a lot of attention in Northern countries, where immediate steep cuts in fossil fuel emissions are most crucial. Roughly speaking, this package consists of

- large-scale public works
- subsidy shifting
- conventional regulation
- green taxes and other non-trading market mechanisms
- legal action

– all backed and monitored by popular movements and evaluated against ambitious short- and long-term targets.

Sounds like a complicated blueprint to implement.

Actually, it's not a blueprint. Neither is carbon trading. Political action isn't the implementation of blueprints. The future isn't decided by planners sitting in rooms by themselves and then slotting their plans into a black box of default political institutions. It's more a matter of alliance-building, of move and counter-move. The package mentioned above isn't a theory but a historical observation of the current state of an ongoing process of discussion, conflict, consultation and bridge-building in which a lot of political institutions themselves come into question. Proposals for action flow out of such processes; the processes do not flow out of them.

All right, no need to go on about it. But could you spell out the thinking surrounding the strategies you mention?

First, sweeping public works programmes could help reorganise Northern societies' infrastructure away from fossil fuel dependency in a way that pollution trading and taxes are incapable of doing. Such programmes could, for example, revamp transport systems; decentralise electricity networks to make them more efficient, reliable, secure and receptive to solar, wind and micro-hydro power;[2] and help overhaul inefficient heating systems.

'Tinkering around the edges won't solve the problem. Just beating the carbon lobby won't solve the problem. Full social pricing and better information distribution are not enough. Using resources wisely will require institutional change.'

Gar Lipow, 2006

Phasing out subsidies for fossil fuel exploration, extraction, refining, transport and use is a second climate-friendly structural shift that cannot be made through trading schemes but only through collective decision-making. The subsidies in question underwrite a huge range of activities from domestic and foreign pipeline development to superhighway construction, airport expansion, long-distance shipping, military operations, tax exemptions for aviation and bunker fuel users, low-cost credit and insurance for fossil fuel firms and consumer rebates for sports utility vehicles.[3] Powerful enough political movements could shift such towards a coherent programme of, for example: renewable energy development; community-based planning for lower-carbon lifestyles; support for local movements protecting land, forests and smallholder agriculture; better insulation and heating; promotion of public debate and exchange on climate change; and just treatment for those who would otherwise suffer from the transition to less carbon-intensive industry, including fossil fuel workers and the poor. If coordinated regionally, increased support for renewable energy development could well spur global change more rapidly than negotiations at the United Nations, since it would threaten the competitiveness of countries that continued to insist on extreme fossil-fuel dependence.[4] Cutting off public subsidies for the export of climate- and people-unfriendly technologies would have the virtuous side effect of supporting local efforts to defend low-carbon lifeways against large-scale and often corruption-ridden projects involving fossil fuels.[5]

But wait a minute. Aren't fossil fuels the cheapest source of energy for Southern countries?

It's not so simple – not when the history of subsidies is taken account of, costs such as health impacts, crop losses, and pollution damage are factored in, and fuel price risks are acknowledged.[6]

Moreover, most foreign-backed fossil fuel projects in the South don't provide cheap energy to the South itself, but rather result in fossil

fuels being exported and consumed in the industrial North. For example, Nigeria, the world's eighth largest oil exporter, imports 76 per cent of its petrol, and 34 per cent of its kerosene, at a cost of USD 3.6 billion. In the oil-producing Niger delta region, firewood is the primary energy source for 73 per cent of the people.[7]

In addition to shifting subsidies away from fossil fuel development, it's also important to curb subsidies for deforestation provided by national governments, export credit agencies, the World Bank and others. These include subsidies for pulp mills, industrial monoculture plantations, mining in forested areas and other enterprises that result in displacement, impoverishment and ecological degradation.[8] Such a move would help in both slowing down and adapting to climate change. Shifting subsidies away from military budgets, particularly that of the US, would also free up money for tackling climate change.[9]

A third element of a strategy for structural change in the North, in addition to public works and subsidy shifting, would be more serious conventional regulation setting efficiency and carbon use standards for buildings, vehicles and urban development and land-use planning. As noted in Chapter 3, such regulation is often capable of improving efficiency faster, at a lower cost, and in a less coercive way than market mechanisms such as trading or taxes.[10] It can do things that trading, taxes and voluntary programmes cannot do.[11]

Fourth, as structural change provides more low-carbon choices (better public transport, more efficient machinery), carbon taxes and taxes on material intensity (focusing on unnecessary or throwaway use of metals, water, wood, plastics and so forth) come to have a greater effect.[12] Revenues from such taxes could then be used to reduce taxes on labour, fund low-carbon energy and increase efficiency, or offer rebates to buyers of greener, more efficient equipment.

Further market instruments that do not demand impossible types of quantification could then be applied in the service of innovation. 'Environmental competition statutes' that require polluters to pay costs that their competitors incur in reducing pollution are a good example.[13]

The courts provide yet another important arena for action beyond the trading floor. 'If generally accepted scientific assessments are accurate, global warming is likely to be the most expensive environmental problem ever', explains US law professor Andrew Strauss. 'Determinations are going to have to be made about who is going to bear these costs…[and] litigation will very likely play a role.' Oxford climate modeller Myles Allen and others advocate the use of public nuisance, product liability and human rights law against greenhouse gas polluters.[14] Allen's colleague, science and technology scholar Steve Rayner,

suggests that the 'threat of civil liability may prove to be a much more powerful' incentive to the US electricity utility industry to reduce its emissions' than the threat of regulation.[15] International law may provide still further avenues for action against global warming, through lawsuits against banks and export credit agencies for corruption and human rights violations connected with fossil fuel projects.[16]

Getting reacquainted with what works

In the South as well as the North, community-level or popular strategies of proven worth in fostering climatic stability also need to be better recognised by environmentalists and systematically strengthened instead of being penalised and undermined by national governments, the World Bank, export credit agencies, the World Trade Organization and so on. For example:

- Networks protecting community forests, other local commons and low-input swidden or integrated farming systems (increasingly supplemented with biogas energy production) are a powerful force against climatically destabilising land clearance, commercial logging, high-input intensive agriculture and long-distance food transport.
- Movements against trade liberalisation, privatisation and commodification worldwide help to slow growth in unnecessary transport and protect local subsistence regimes against threats from fossil fuel-intensive sectors.[17]
- Popular movements against oil wars, gas and oil pipelines, fossil fuel extraction, power plant pollution and airport and highway expansion also help curb extraction of fossil fuels.
- It is increasingly clear that small renewable energy sources over which local communities have power, whether off-grid or on-grid, are becoming a cheap alternative to fossil fuel-oriented centralised generating systems in many areas of the South.

Insofar as they defend local resilience and promote community solidarity and organisation, such strategies are crucial not only in slowing climate change but also in adapting to it.[18] As scholars Elizabeth Malone and Steve Rayner observe, 'fostering flexibility means fostering power at the local level'.[19] As emissions trading expert Ruth Greenspan Bell explains in an article on sulphur dioxide trading in China, fostering that power requires closer attention to realities on the ground than pollution trading advocates have usually been willing to pay:

> In their enthusiasm for efficiency over other values, the advocates for market-based instruments for environmental control have re-

> versed the order in which environmental solutions are found. They have given their prescriptions without first doing a physical examination of the patient; in other words, they have first recommended environmental instruments and secondarily tried to bend institutions to support the already identified cure… . Those who advise governments to adopt reforms for which the institutional basis does not yet exist put the cart before the horse, a costly mistake that directs weak countries in the direction of solutions they have little hope of implementing. Instead, the donors and advisers should…take into account existing capabilities and institutions [and] find examples of small, albeit imperfect, efforts that seem to be working and building on them.[20]

Well, this is all very interesting, but is any of it really going to happen?

A lot of it already has happened, or has clear precedents. A lot of the strategies mentioned above have a far longer record of use than pollution trading – and a more successful one. Public works and subsidy-shifting have been used for millennia to change societies' energy-use patterns – cases range from the ancient irrigation systems of Asia to the US's undermining of rail travel and subsidisation of interstate highways and suburban sprawl following the Second World War.[21] Taxation was used during the Xia and Shang Dynasties in China, in ancient Aksum and Ghana, ancient Egypt, Greece, Rome, and in the Aztec and Inca empires. Conventional pollution and energy regulation has been around for at least 150 years and has many achievements to its credit, including in the US from the 1970s onward at both national and state levels.[22]

Local forest or water commons regimes, meanwhile, have played a climate-stabilising role for decades or, in many cases, centuries.[23] Popular movements against privatisation and resource wars have been achieving concrete results for just as long. Hundreds of communities on at least four continents have been successfully protecting their local areas from oil drilling for decades.[24] In Costa Rica, the government has halted efforts by US oil companies to explore and extract hydrocarbons from some of the country's richest ecosystems.[25]

Many of these strategies are already being explicitly directed at climate change. Climate-related regulation and climate-related tax codes are already on the books in many countries. In 2000, the Caribbean nation of St. Lucia announced a unilateral plan for a fossil fuel-free energy future.[26] Following the lead of the city of Växjö,[27] Sweden is also planning to abandon the use of oil within 15 years and ultimately other fossil fuels as well.[28] Although its claim to have cut emissions from 1997 to 1999 is questionable,[29] China's government has introduced taxes and targets promoting efficiency and renewable energy

more stringent than those in the US, including laws allowing energy from renewable sources to be sold into the grid at a higher price and encouraging more energy-efficient buildings.[30] Even in the US, universities, towns, cities, states and companies are taking their own actions against fossil fuel overuse, often without even mentioning carbon trading.[31] Understanding that strict regulation is inevitable and worried about losing out when it comes, even many large US corporations are pressing their government for stronger intervention.[32]

Shifting subsidies away from fossil fuels, similarly, already has a lot of support. Backers range from grassroots groups in the South to Greenpeace to student organisations, the Climate Crisis Coalition, Platform, the US Climate Emergency Council and the government of Sweden.[33] The Kyoto Protocol itself commits its signatories to 'progressive reduction or phasing out' of damaging subsidies for fossil fuels. The Organization for Economic Cooperation and Development estimates that removing such subsidies would alone reduce emissions by 18 per cent by 2050 while increasing world income by 0.7 per cent.[34] Oilwatch has proposed that nation states halt oil and gas extraction in protected areas and that they be compensated by countries that pledge to reduce drastically their carbon dioxide emissions.[35] Roughly 90 per cent of the US voting public now favours more subsidies and government regulation to encourage renewable energy.[36]

Demonstrators take to the streets in Montreal in December 2005 on the occasion of the 11th Conference of the Parties of the UNFCCC.

Calls for more sweeping taxes on carbon use are also reverberating worldwide.[37] In addition, movements demanding institutional divestiture from banks investing in fossil fuels are getting under way, and there are growing links between movements concerned with carbon trading and those concerned with related forms of privatisation in health, water, education, transport, energy and genetic information, and with biotechnology and nuclear energy. Legal action, too, is already being taken. In Nigeria, local communities have challenged oil companies as well as their own government in the courts over gas flaring and pollution.[38] Environmentalists are also suing US and German export credit agencies for funding fossil-fuel projects abroad.[39] In December 2005, Alaskan and Canadian Inuit peoples sent a petition to the Inter-American Commission on Human Rights claiming that the US was violating their human rights by refusing to cut greenhouse gas emissions.[40] In July 2004, eight states filed a tort-based suit against electricity generators in a court in New York on global warning nuisance grounds. In June 2006, the US Supreme Court agreed to consider a demand by 12 states, together with various cities and environmental organisations, that the George W. Bush regime regulate carbon dioxide to combat global warming.[41]

In short, the question 'what's your alternative to carbon trading?' needs to be turned on its head. Carbon trading itself is an 'alternative' – although it's perhaps too marginal, academic and parochial, when considered in a global context, to deserve even that title. Strategies such as those detailed above have a better claim to be considered part of a living mainstream. To treat the two as if they were on a par signals a catastrophic loss of political and historical perspective.

Choosing allies

OK, I take your point. But if so many of the non-trading approaches you mention are well-established and widely-supported, why aren't they achieving better results? Carbon trading may be a waste of time and resources, but the strategies you mention don't seem to be doing so well against global warming, either!

That's true, but it's important to remember that strategies such as those detailed above are not only 'technically' more realistic than carbon trading, but politically more realistic as well – provided that environmentalists and other activists fulfill their responsibility to help build alliances that can help make them so.

In what ways are they more realistic?

In many ways. Unlike carbon trading, these approaches are built on the basic truth that most fossil fuels will have to be left in the ground.

Unlike carbon trading, they recognise irreversibility and the differences between risk, uncertainty, ignorance and indeterminacy and don't try to calculate the incalculable. Unlike carbon trading, they acknowledge explicitly the real-world functions and limitations of conventional development institutions. Unlike carbon trading, they take into the account the realities of international politics. Crucially, unlike carbon trading, they make no bones about the fact that dealing with the climate crisis is going to involve democratic political organising and an uphill political struggle.

But does dealing with the crisis have to involve democratic political organising? Realistically, there may be no time for that. Maybe environmentalists should just try to make a quick deal with governments and business to solve the problem.

That's the working assumption of many carbon trading supporters in the North. The idea is that environmentalists should throw their support behind policies that offer corporations or rich-country governments the short-term cost savings associated with emissions trading, plus property rights in the atmosphere, plus a flow of cheap credits from carbon projects and new opportunities for investment. In return, corporations or rich-country governments will back emissions cuts while channelling funding and green technology to the South.

One difficulty with this plan is that many corporations have understood from the start that carbon markets are structured in a way that will allow them to take the gravy while leaving environmentalists with nothing. They know that rent-seeking under the EU ETS or horse-trading under the UNFCCC will enable them to delay emissions cuts indefinitely (see Chapter 3). They know that carbon trading often takes the teeth out of other, existing forms of regulation.[42] They know that every pollution trading scheme to date has involved rewarding polluters with free assets. They know the system can be gamed. They know that 'giving carbon a price' need not be an inducement to structural change, especially if they can control that price. And they know that carbon 'offset' projects offer still further opportunities to entrench 'business as usual'. Firms are often delighted when environmentalists support the colonialist claim that the global green future lies in an expanded export of machinery and expertise from North to South and lose no time in setting up mechanisms that allow industry and the World Bank to reap new rewards from a parade of methane-burning schemes, large hydroelectric dams, coal-fired generating plants and expanded monocultures that benefit the world's rich while leaving the course of climate change untouched. Many polluters like carbon trading not because they think it will pay for a just transition to a low-carbon future, but because they are convinced it won't.

While the refrains 'there is no alternative' and 'it's too late to turn back now' play in the background, environmentalists following this plan are now running through a predictable repertoire of salvage attempts: schemes for 'certifying' carbon projects, efforts to persuade governments to auction allowances rather than giving them away, toothless complaints about officials' 'lack of political will' to set adequate emissions caps, press releases seizing on small concessions as 'major victories'. The more committed environmentalists become to this dynamic, and the more they slot themselves into roles as market verifiers, monitors and corporate consultants and trainees, the less they're able to face the extent to which they've been snookered. The harder it has become, too, to acknowledge that they've made political alliances with the wrong parties and that in the end, the fight against global warming has to be part of the larger fight for a more just, democratic and equal world.

But why should anyone have to choose their allies? Aren't we all in this together? Global warming is, after all, global. It's going to hurt everyone. You make it seem as if there's some kind of class war going on. It sounds so ideological.

In climate politics, as in everything else, different sides have different stakes, different vulnerabilities, different backgrounds, different commitments, different interests and different kinds of power. That's largely what this special report has been about. For the sake of a viable future, these differences need to be explored and understood, not ignored. Too often the peremptory exclamation 'You're just being ideological!' – like the peremptory question 'But what's your alternative?' – functions merely to shut down a conversation that needs to be continued and expanded.[43]

I'm still not convinced. In Chapter 3 you made fun of carbon trading by saying that it could only function effectively and equitably in an ideal world in which every political problem had already been solved and every institution transformed virtually into its opposite. Now it seems like you're saying that the same is true for any strategy for contending with global warming.

No. Climate activists who are realistic about politics – and politicians who are realistic about climate change – must start from where the world is today and contend with the institutions that exist today. That means choosing political allies to whom global warming is more than just a new threat to or opportunity for profit and market share, and who will have an interest in defending and building the institutions capable of coping with it.

If carbon trading, *per impossibile*, could be carried out the way its environmentalist proponents claim to want it to be carried out, it would

hold little appeal for the biggest polluting businesses. If it is carried out as it is today, then its environmentalist proponents have lost their battle. Either way, environmentalists are deceiving themselves if they think that carbon trading is going to 'jiu-jitsu' ruling elites into serious action on climate change. There are no detours around political organising.

No Detours around Politics

Q. At the talks you give to American audiences, you are often asked the question, 'What should I do?'

A. Only by American audiences. I'm never asked this in the Third World. When you go to Turkey or Colombia or Brazil, they don't ask you 'What should I do?' They tell you what they're doing… These are poor, oppressed people, living under horrendous conditions, and they would never dream of asking you what they should do. It's only in highly privileged cultures like ours that people ask this question. We have every option open to us, and have none of the problems that are faced by intellectuals in Turkey, or *campesinos* in Brazil… But people [in the US] are trained to believe that there are easy answers, and it doesn't work that way… You want a magic key, so you can go back to watching television tomorrow? It does not exist. Somehow the fact of enormous privilege and freedom carries with it a sense of impotence, which is a strange but striking phenomenon… There is no difficulty in finding and joining groups that are working hard on issues that concern you. But that's not the answer that people want. The real question people have, I think, is, 'What can I do to bring about an end to these problems that will be quick and easy?'… But that's not the way things work. If you want to make changes in the world, you're going to have to be there day after day doing the boring, straightforward work of getting a couple of people interested in an issue, building a slightly better organisation, carrying out the next move, experiencing frustration, and finally getting somewhere… That's how you get rid of slavery, that's how you get women's rights, that's how you get the vote, that's how you get protection for working people. Every gain you can point to came from that kind of effort.[44]

Noam Chomsky, 2005

Indeed, no aspect of the discussion on global warming can be disentangled from debates about colonialism, racism, gender, exploitation and the democratic control of technology. What, for example, is to be done about the fact that the world – and mainly the rich minority – uses the energy equivalent of 400 years of plant growth every year thanks to being able to burn the 'buried sunshine' of fossil fuels?[45] To switch enough of the world's energy production from fossil fuels to biomass so as to stabilise atmospheric concentrations of carbon dioxide without cutting energy use would require more land than is currently used for all of the world's crops. To switch enough energy

production from fossil fuels to centralised production of wind power without cutting energy use would require devoting a parcel of 210 million hectares, or a land area bigger than Mexico, to wind turbines; converting entirely to solar would mean covering an area of 14 million hectares, the size of Bangladesh or Greece, with solar panels.[46] Yet to resort to nuclear power would be disastrous for global security and disastrous for future generations. There's no way around it: fossil fuels or not, keeping the rich supplied with the same amount of energy they use now implies resource takeovers with deep colonialist and anti-democratic implications.

But by the same token, surviving global warming is not only a political problem but also a technical problem, no?

Of course. The real difficulties, however, as experts from all sides of the political spectrum tend to agree, are more political than technical.

So we don't need a technological revolution to deal with the issue?

No. A wealth of studies have already traced out, in some theoretical detail, enforceable pathways that industrialised countries can take towards a non-colonialist, safe and convivial non-fossil future – pathways that neither require nor would benefit from emissions trading.

In the US, for example, Amory Lovins and his colleagues at the Rocky Mountain Institute have charted a non-nuclear 'roadmap for getting the United States completely, attractively, and profitably off oil' while creating jobs, improving security and rebalancing trade, featuring efficiency, biofuels, saved natural gas, and, optionally, hydrogen.[47] Lovins' proposals rely on a suite of government policies that would allow more decentralised power generation; cut fossil-fuel subsidies; decouple profits from utility electricity sales; let utilities profit from customers' lowered energy use; tax aviation, driving and petrol; impose a tax on inefficient products while giving rebates for efficient ones; encourage 'smart growth'; promote research and development; provide information about available efficiency improvements; invest in energy supply infrastructure and greener equipment; and help retrain workers for lower-carbon commerce. Systems analyst Gar Lipow reckons that in 30 years the US could phase out fossil fuels entirely, at an annual cost of less than a third of the country's current military budget, or less than the tax breaks given to the very rich over the past 40 years: 'it is a myth that global warming is a technical rather than a political problem'.[48]

In Europe, Friends of the Earth England, Wales and Northern Ireland has documented how a 48-71 per cent reduction in carbon dioxide

Waiting their Chance

Enormous reserves of common sense and ingenuity worldwide are awaiting proper opportunities to be tapped in the service of minimising and coping with climate change.

The great bulk of this shrewdness and inventiveness is of course to be found in the ordinary people of the South. But in the North as well, huge potential is waiting to be unblocked.

In the US, opportunities for efficiency abound that can 'pay for themselves in an extremely short time',[51] provided that government does not shy away from regulation. These include control systems that reduce energy consumption in irrigation systems by up to 99 per cent, super-adobe construction,[52] houses and commercial buildings that save up to 90 per cent of heating and cooling costs, ultra-light rail, and so on. The Intergovernmental Panel on Climate Change estimates that if good design and insulation were extended globally, greenhouse gas emissions could be cut by up to 40 per cent.[53]

Zero-carbon housing is already up and running in the UK and Germany. Woking Borough Council near London has reduced carbon emissions in council buildings and properties by over 77 per cent since 1990 through more localised power sources, financed by energy efficiency savings. Architects Atelier Ten have designed a way of keeping buildings cool without air conditioning, using a termite mound as their model.[54] Even the big corporate sector is waiting its chance. In Britain, 74 companies' emissions reduction efforts have already yielded USD 11.9 billion in gross savings, largely from efficiency.[55]

Technological change can be swift, given the right context. During the Second World War, it took US car manufacturers only six months to convert to military production, and the country took only 12 years to switch from steam to diesel/electric locomotives and from uncontrolled automotive emissions to catalytic conversers. During 1975-2000, the US used 3.43 per cent less water per year per dollar of GDP, and, during 1977-85, helped by regulation, made very rapid oil and energy savings. Thanks in part to building and appliance efficiency standards, per capita electricity use in California has remained virtually flat since the mid-1970s, while it has risen by more than half in the rest of the US.[56]

emissions could be achieved in the UK by 2020 in the all-important electricity sector, without any new nuclear power or geo-sequestration, and with a decline in the use of natural gas.[49] As noted in Chapter 3, consultant Roger Levett estimates that fuel use in the UK could be cut by 87 per cent and carbon-based fuels eliminated altogether using existing technologies. Levett points out that 'near-zero carbon' housing is possible now, without any new technological breakthroughs, together with a 90 per cent reduction in automobile carbon pollution and improvement in the quality of life – provided that the

state undertakes planning and regulation to help establish new 'virtuous circles' including community restructuring, better public transport and higher vehicle occupancy.[50]

Markets, states and freedoms

I'm still suspicious of all this talk about government action. Economists and political leaders, particularly in the Anglo-American world, like to say that markets promote freedom and choice while state regulation amounts to 'command and control'. Some Northern environmentalists even claim that to criticise the carbon market is to embrace coercion and 'totalitarianism'. What do you say to that?

Merely that it reflects another serious loss of perspective and a lack of acquaintance with life outside the economics classroom. Turning things into commodities has always made possible some freedoms only by precluding others. During the Industrial Revolution in Europe, many people gained the freedom to move around and sell their labour but lost the freedom to raise their animals on the commons. Today, pension fund managers have the freedom to shunt massive investments from country to country with one or two clicks on a computer mouse, while the citizens of those countries may not have a choice of affordable medicines. Similarly, having the option of driving wherever you want to go can preclude having the choice of getting access to amenities without a car, and eliminates the choice of keeping urban areas distinct from rural areas.[57] It may also narrow the choices of ordinary people in the Niger delta or herders along the Chad–Cameroon oil pipeline. As Michael Jacobs quips, the market is not always Adam Smith's 'invisible hand' but often an 'invisible elbow' instead. The question always needs to be asked: Whose choices are we talking about, and which ones?

Markets transform and centralise coercion in certain ways; they do not get rid of it.[58] Every market is suffused with 'command and control': policing of property and contracts; foreclosure; dispossession; surveillance; registration; standards; bureaucracy. Every market, too, entrenches the historical 'command and control' that was used to establish its physical infrastructure and price-setting or bargaining systems, whether those controls were exercised through law or brute force.[59] The other side of the coin is that regulation's constraint of consumer choices, together with multiple, systemic investments in public works, can often expand the range of other choices available to people and their freedom to enjoy public goods.[60]

Similarly for climate change. The Kyoto Protocol and other trading-oriented approaches limit present and future choices in far-reaching

ways – many of which have been explored at length in this special report – at the same time they open up new opportunities for big business. Approaches stressing the sort of structural change that trading can't achieve, meanwhile, feature other kinds of restraint, distributed among other groups, but also other kinds of freedom. As the late Ivan Illich observed nearly 35 years ago, a low energy policy allows for a wide choice of ways of life. If, on the other hand, 'a society opts for high energy consumption, its social relations must be dictated by technocracy and will be equally distasteful whether labeled capitalist or socialist'.[61]

You've made a great deal of the hazards of turning over control over the atmosphere to business through carbon markets. But isn't it just as dangerous to turn over control of the atmosphere to governments? Governments are often poor stewards of the public interest. They dispose of common assets below market value, ensure that their distribution makes the rich richer and the poor poorer, use the proceeds for private gain, and so forth. Look at the way governments hand out commercial concessions or indigenous peoples' lands. In addition, even if it's true that carbon markets allow corporations to seek gigantic unearned rents, surely more conventional forms of regulation give them similar openings to 'capture' the regulatory apparatus,[62] or influence legislators voting on tax laws. So what's the difference? You distrust market incentives and market forces, but do you really think there are such things as benign, omniscient governments, and that they are capable of solving the climate crisis? And if not, how are you going to organise so as to bring about the kinds of government action you describe?

That's a useful question. But let's start by challenging the dichotomy between 'market mechanisms' and 'government regulation' that it implies. Carbon markets themselves are a complicated new form of government regulation. As Karl Polanyi would have been the first to point out, they require what he called an 'enormous increase in continuous, centrally-organised and controlled interventionism' and 'deliberate state action' (see Chapter 3). They expand the power over the atmosphere not only of business but also, necessarily, of state agencies. They are no more neutral, technical 'instruments' for attaining external, political goals than the state itself is.

Anybody worried about the powers, clumsiness and corruptibility of the state and its regulators – and who isn't? – accordingly ought to be worried about carbon markets for the same reasons. The difference is that, with carbon markets, there are a lot of additional reasons for concern. As Chapter 3 has detailed, carbon trading, in addition to granting large corporate polluters new powers over the earth's ecosystems, introduces so many further complications, centralised controls, and opportunities for fraud that it makes democratic scrutiny and oversight virtually impossible.

What is required is for the political support behind some of the movements and approaches mentioned above to be deepened, extended and encouraged, not to be undermined and overshadowed by a set of little-tried, regressive gimmicks destined to fail in any case.

Who said anything about overshadowing? I'm not against any of the activities you mention. I acknowledge the importance of public investment. I know regulation and taxes are necessary. I can understand the central role of commons regimes, of greater self-sufficiency and all sorts of local initiatives. But isn't there a role for carbon trading in supplementing and supporting all these approaches? Trading is the wave, not the water. It's merely one part of what will make a global climate regime work. Let a hundred flowers bloom!

Let's review the situation. Since 1997 or so, carbon trading has come to usurp the great bulk of the UN's work on climate change, with experts, diplomats and politicians devoting endless hours to trying to work out the insoluble complexities of a system that in the end functions primarily to shore up fossil fuel dependence. Carbon trading rewards the worst polluters with huge free public assets, depriving climate-friendlier enterprises of both money and human brainpower. Carbon trading undermines the impetus for regulation, taxation and reduced consumption in countries such as the UK, Sweden and the US; slows innovation in both North and South; provides greenwash for climate-unfriendly practices such as coal mining, industrial tree plantations and large hydroelectric dams; and hogs the time of Southern civil servants who could be far more beneficially engaged. Perhaps most important, carbon trading mainly benefits and empowers precisely those institutions most active in blocking and interfering with low-carbon lifeways and climate-friendly industrial change.

Take, for instance, one of the biggest players in the carbon market, the World Bank. The Bank itself admits that 'renewable energy technologies – wind, mini-hydro, and biomass-electric – are the least-cost option…for off-grid electrification'[63] of the sort needed by many of the world's 1.6 billion people who do not have access to electricity, as well as being crucial to climate change mitigation. As noted in Chapter 1, the Bank's own internally-commissioned Extractive Industries Review recommended that it get out of coal immediately and get out of oil by 2008. Yet the institution continues to champion large-scale, centralised fossil-fuel projects at the expense of renewable energy – the Chad-Cameroon pipeline, the Baku-Ceyhan pipeline and many others.[64] Eighty-two per cent of its oil projects are for export to the North. Its carbon credit portfolio extends the life of fossil-heavy technologies in the North while providing only derisory support for climate-friendly initiatives in the South. The Bank's top two

energy-loan beneficiaries are oil contractor Halliburton and oil company Shell; number five is Exxon-Mobil and number 12 is Enron.[65] The main victims of the Bank's infrastructure and market-first policies, on the other hand, are ordinary people with low-carbon livelihoods – who often achieve their results in the teeth of the institutions that support trading – as well as the commons that support them.[66]

Carbon trading's main private sector beneficiaries, whether oil companies, plantation firms, or electric utilities, share a similar orientation. By their own admission, private banks involved in carbon trading 'can't deal with communities', while brokers point out again and again that 'the carbon market doesn't care about sustainable development'. In addition, a global carbon credit market divides communities from each other in a way that impedes, rather than helps, the search for common solutions. Villagers near a carbon project in Chile are unlikely ever to see firsthand how the project's credits might help perpetuate pollution in Japan, drown villages in Bangladesh, or keep motorways clogged in Canada. Well-off buyers of 'offsets' from wind farms in New Zealand are unlikely to investigate what might link their 'green' purchases to the havoc wreaked by pipelines pushed through Nigeria or Alaska.

In what ways, then, does carbon trading 'supplement' or 'support' other approaches to climate change? If carbon trading isn't undermining and overshadowing genuine solutions to climate change, it's hard to imagine what would.[67]

All right, but does that necessarily have to be the case? After all, mightn't carbon trading be helpful in financing a just transition to a non-fossil future?

How?

Well, first of all, suppose – just suppose – that Northern governments could be forced by popular pressure to auction off tradable allowances instead of giving them away free to business. Couldn't the revenues be used to support the most vulnerable sections of society through the transition to a non-fossil economy?

Maybe. But just as the question arises of who gave European Union governments the right to give away so much of the earth's carbon-cycling capacity to some of their largest corporations under the EU ETS, so too does the question of who would give governments the right to auction it.

There are also a lot of other possible sources of support for the vulnerable during that transition. For example, part of the subsidies now being given to fossil fuel development could be put towards a just transition. The need to support the fuel-poor and retrain the jobless is hardly by itself an argument for carbon trading.

What about the international level? If global warming is to be addressed, the North is going to have to pay the South not to use fossil fuels. Not only is the North in debt to the South for centuries of ecological and social appropriation; it also needs to help out for the sake of its own future. Who's going to put up the cash for this if not Northern carbon credit buyers?

Are you suggesting that the Clean Development Mechanism is helping to 'decarbonise' either the North or the South? Chapters 3 and 4 have shown that that's not going to happen.

OK, but maybe something like *the CDM could provide the necessary funds.*

What exactly would something *like* the CDM be? Again, let's review the situation. In today's international carbon project credit market, the Northern polluters who are supposedly paying for 'green development' in the South are in fact getting paid themselves. They get to continue using fossil fuels at a bargain price. And they get to profit from exporting goods and expertise to enterprises most of whose contribution to alleviating climate change is, to put it charitably, questionable. Instead of supporting community-driven renewable energy projects, for example, coal, oil and hydrofluorocarbon corporations are making money from end-of-pipe technologies that they develop themselves. If the North is genuinely interested in paying for a renewable future in the South, that's hardly the way to go about it.

But suppose you had a rule, as the Centre for Science and Environment proposed back in 1998, that no CDM trade could take place that did not involve a 'transition to the use of non-carbon or biomass energy sources'.[68] *That could create a huge market for solar energy and other renewable technologies in the South.*

To what extent could a mechanism like the CDM ever involve a transition away from carbon-based energy? Remember the basic principle of the CDM market: finance goes to projects only at the cost of licensing and supporting continued extraction and use of fossil fuels elsewhere. Nor have eight years of environmentalist pleading resulted in much demand for renewable energy projects from CDM credit buyers. These are not projects this market supports (see Chapters 3 and 4).

That's not to say that the ideal of global equity, reparations and funding for renewable technology isn't important. But it's not going to be achieved through trading; nor by elite institutions that have played such a large part in the stupendous widening of the gap between rich and poor over the past 50 years,[69] such as the World Bank. Effective reparations and a transition away from fossil fuels will have to be achieved through a broader-based political struggle, not an elite-to-elite commercial deal.

From an Open Letter by Oilwatch

'Never before have the limits of the current development model based on hydrocarbons been so clear or close.

'Never before has the relationship between oil and the networks of power that control the world been so clearly understood, nor have the relationships between oil and the main causes of misery that affect humanity been so evident…

'For the Southern part of the world, the oil model has meant the perpetuation of inequitable exchange, technological dependence, indebtedness, and impoverishment. The ecological debt between North and South, which began during the colonial years, rose with unequal economic and ecological exchange.

'We have accepted separately each one of these aggressions. Or worse still, fought among ourselves: inhabitants of one country fighting against another, oil workers against indigenous communities, people from the North against those from the South, the poor of the cities against indigenous and peasant peoples, those ill from consumption against pacifists, those that propose against those that criticize… And the list goes on and on.

'What are the organizations and networks with whom we can start a positive collaboration in the fight against the oil civilization? What are the social, local and global movements that cannot be ignored in our efforts? What are the international agreements and programs that can best help us in this process? What are the new initiatives that we could and should devise?

'To answer these and other needs, Oilwatch is inviting sympathetic networks to initiate a joint dialogue on our struggles and launch a global campaign against a civilization based on oil.

'We invite you to share your opinions, comments, suggestions and ideas, to build a new path together…where we can reflect each and every one of our struggles. This way, each and every one of our battles will gain a new dimension.'[70]

Oilwatch, 16 September 2005

What institutions could conceivably play a part? There are no pat answers, but the question needs to be raised *before* going too far with proposals for paying ecological debt or funding a non-fossil transition in the South.

In the meantime, it might be useful to keep in mind how strange the demand is that the North make up for its historical overuse of the earth's carbon-cycling capacity by paying for clean development in the South, at a time when few moves are being made to curb that overuse. It's a little like demanding reparations for slavery without abolishing slavery. The demand is incontestably legitimate, but it raises the question of whether the problem is being addressed at its root.

All right, but I'm still troubled by the feeling that the various non-trading approaches for structural change that you mention aren't – well – global *enough. Don't global problems such as global warming need global solutions? The 'alternatives' I really want to see are global alternatives, not the hotchpotch of local, regional, and national institutions, movements and initiatives you seem to have been talking about so far. Global warming is not going to be stopped by an uncoordinated and piecemeal attack, but only by a global regime.*

What do you mean by global? In what sense is the Kyoto Protocol, say, global? In what sense are movements supporting local forest commons, say, not global?

The distinguished political journalist Neal Ascherson once referred to what he called the 'dumbbell world' in which Anglo-American foreign policy was most intensively discussed and defined. One end of the dumbbell, in Ascherson's whimsical vision, consisted of a circle enclosing a few government offices, posh neighbourhoods and airports in London. The other consisted of a circle enclosing a few government offices, well-off neighbourhoods and airports in Washington. The two were linked by the contrails of jets flying back and forth across the Atlantic.

Often, what people refer to when they use the word 'global' is something like Ascherson's 'dumbbell world' – a diplomatic and political community residing in very thin but very long habitats consisting of buildings and luxury homes in capital cities around the world, together with the reclining seats on the jet aircraft that link them.

What makes this community and what it does global? Its interests are neither universal nor neutral, but particular to the group. The language it speaks is not a global language spoken by everyone, but merely the provincial dialect of UN offices, state documents and neoclassical economics; and its institutions are local institutions like all other local institutions. Like some other communities, this community does have some frightening powers and friends, and some useful powers and friends. There are certain valuable things it can do; the Montreal Protocol on the ozone layer is perhaps one example. But its territory, while very long, is also very thin, and the community's understanding of and influence over an issue as complex and intercultural as climate change is limited, even when it is able to organise its own members around something like the Kyoto Protocol.

Any approaches to climate change that are 'globally effective' are going to have to be organised, fairly independently, in a great many communities outside the 'dumbbell world'. That means treating the 'hotchpotch' of local, national and regional initiatives with a good deal of respect. The question 'What's your alternative?' must always

be answered in the first instance with another question: 'Alternative for whom?' The alternative that a denizen of the 'dumbbell world' is looking for may not be the one that a corporate executive is likely to accept – nor a villager in India.

Defining the climate crisis, in good 'dumbbell world' fashion, as a problem to be solved through indefinite capital accumulation, state subsidies for large corporations and consultants, transnational capital flows, international trade and national 'development', makes it almost impossible to connect top-down emissions targets with support for effective actions at the local level. It also tends to threaten the reserves of flexibility many communities will need to preserve in order to adapt to the degree of climate change that is already inevitable. As researcher R.W. Kates puts it: 'If the global poor are to adapt to global change, it will be critical to focus on poor people and not on poor countries as does the prevailing North-South dialogue. The interests of the poor are not always the same as the interests of poor countries, since in the interests of "development", the poor may grow poorer.'[71]

Anthropologist and development specialist Michael Thompson and his colleagues put it in slightly different terms: '…the only frameworks that can tell you *anything* about the likely efficacy of a policy are those at the most local level… What is needed is…an approach that places the "mere details"…at the very centre of the stage and relegates to the wings the alarm bell-ringers and their immaculate prescriptions…'[72]

Conclusion: decentring climate politics

Radical university scholars are sometimes ridiculed for the funny words they use. But behind some of their words lurk useful ideas. One such word is 'decentring'.

The old standard elite university curricula, many radical academics say, should perhaps not be thrown out, but rather 'decentred': modified and expanded to include suppressed voices and achievements. Traditional fields of study should not be abandoned, but supplemented and opened up to critique from outsiders with different stakes in the issues, in the way Indian thinkers have been able to 'digest' colonialism,[73] Colombian peasants to rework early European economic thinking for their own purposes[74] and feminists to get under the skin of the biases shaping the work of a Locke or Malthus.

This is perhaps the way that the climate change literature now spilling onto the pages of newspapers worldwide has to be thought about.

Insofar as this literature has been digested only by people of a single social background, it has inspired only limited – and sometimes self-contradictory – political thinking. Its shocking conclusions have led all too often merely to empty calls for political leaders to 'do something' or to the technical and market fixes that have been the subject of this special report.

The results are often as disturbing as the climate crisis itself. Confronted by climatologists' observations, for example, James Lovelock, the renowned scientist who created the concept of Gaia, the self-regulating Earth, has advocated nuclear power as a way of saving 'our' electricity. Urging his readers to prepare for future climatic surprises in the same way that 'travellers from the north' take anti-malarial drugs before going to the 'tropical south' or 'check how the local war is progressing' before going to the Middle East, Lovelock concludes that a 'small permanent group of strategists' unswayed by the 'noisy media and special interest lobbies' is needed in order to 'act fast enough for an effective defence against Gaia'.[75]

It would be easy to dismiss Lovelock for his advocacy of dictatorship, for his nuclear enthusiasms, or for the staggering if unconscious racism that sees conflict in the Middle East – host to bands of colonialists and imperialists since long before Standard Oil made its first deals in the region – as a matter of 'local' wars. But other figures with similar backgrounds and institutional loyalties draw similarly narrow and dangerous conclusions from their understanding of the crisis. Robert Watson, the ozone specialist who, with admirable devotion, helped organise scientists worldwide around a consensus emphasising the seriousness of climate change while deftly countering George W. Bush's climate misinformation campaign, now works to undermine renewable energy by defending an expansion of the 'clean coal' industry from his post at the World Bank.[76] The IPCC, the source of the canonical summaries of climatic trends, generally bypasses serious study of the social roots of the crisis in favour of economic modelling and rubber stamps for carbon trading. Sir Crispin Tickell, who early on raised consciousness with moving essays on global warming, now sits on the board of a carbon 'offset' firm, Climate Care. Despairing of the possibility of keeping fossil fuels in the ground, Paul Crutzen, one of atmospheric science's elder statesmen, now advocates using balloons or artillery shells to sow sulphur dioxide particles into the stratosphere to reflect sunlight and slow down the planet's warming.[77]

Every individual showing concern over the climate crisis deserves respect. But respect also involves acknowledging that different people have different backgrounds, loyalties and understandings. The notion that the ideas of a Lovelock, a Watson or an IPCC should go uninter-

rogated by Indian villagers, Peruvian fisherfolk, or poor communities across the fence from Louisiana oil refineries is simply irrational. Such ideas need to be evaluated by people who know from experience what commodification of land, water and air mean to the poor, what the effects of nuclear contamination are, and how the World Bank's climate policy works on the ground – and who have their own interests and are evolving their own contributions toward dealing with the crisis. The initiatives of organisations and networks such as Oilwatch, Palang Thai, Platform, Friends of the Earth, the Centre for Science and Environment, Rising Tide, the New Economics Foundation, the Durban Group for Climate Justice and tens of thousands of other groups, many of them located at the grassroots in both South and North, already go far beyond the default thinking of global elites. But work on climate change and the search for ways out of the crisis can't be carried forward fruitfully without an even more thoroughgoing decentring of the debate.

Any study of 'alternatives' must begin with this truth – not with a call for yet more formulas to feed to, and nourish, the institutions that bear so much of the responsibility for the climate crisis and many others. This special report has been a modest plea for greater understanding of that truth.

1 Ruth Greenspan Bell, 'Choosing Environmental Policy Instruments in the Real World', Organisation for Economic Cooperation and Development, Global Forum on Sustainable Development, OECD, Paris, 11 March 2003, pp. 4-5: 'countries most in trouble are not getting a well-rounded picture about what is achievable . . . trading is not the dominant approach to US environmental protection, even in a fully developed market system'.

2 Walt Patterson, 'Decentralising Networks', *Co-Generation and Onsite Power Production*, January/February 2005, http://www.chathamhouse.org.uk/pdf/research/sdp/WParticle0105.pdf; Mae Wan Ho *et al.*, *Which Energy?*, Institute of Science in Society, London, 2006; Amory B. Lovins *et al.*, *Winning the Oil Endgame*, Rocky Mountain Institute, Snowmass, CO, 2004, http://www.rmi.org/images/other/WtOE/WtOEg_72dpi.pdf.

3 Lovins *et al.*, *op. cit. supra*, pp. 19–22.

4 Steve Rayner, Testimony in House of Commons Environmental Audit Committee, *The International Challenge of Climate Change: UK Leadership in the G8 and EU. Fourth Report of Session 2004–5*, The Stationery Office, London, 2005, Ev 136.

5 Bretton Woods Project, '"Cleaning" Energy: Ambiguous Framework Proposes Coal and Large Hydro', 19 June 2006, http://www.brettonwoodsproject.org/art.shtml?x=538529. According to some estimates, the money the World Bank lends every year for fossil-fuel projects would be enough to provide small-scale solar installations supplying electricity to 10 million people in sub-Saharan Africa with electricity (Christian Aid, *The Climate of Poverty: Facts, Fears and Hope*, London, May 2006, p. 22).

6 See, e.g., Chris Greacen, 'Inexpensive, Secure Electricity? Coal vs. Clean Energy', 2005, http://www.palangthai.org.

7 These figures are due to Greg Muttitt of Platform, http://www.carbonweb.org.

8 See, for example, http://www.wrm.org.uy.

9 The Progressive Forum, 'Interview with Lester Brown', 26 April 2006, http://www.energybulletin.net/15705.html.

10 Gar Lipow, *Cooling It! No Hair Shirts Solutions to Global Warming*, forthcoming, 2006, http://www.nohairshirts.com; Ross Gelbspan, 'Toward a Global Energy Transition', *Foreign Policy in Focus*, January 2004, http://www.fpif.org/pdf/petropol/ch5.pdf.

11 For example, corporations often invest in control over labour rather than energy-saving equipment that, given tax incentives, saves more money (Lipow, *op. cit.*). In the UK, many investments in waste minimisation, water conservation and other efficiency measures that began to yield positive returns to industry in three years or less were not made until government regulation required them, and would have taken much longer for industry to get around to if the only incentive was taxation. See http://www.envirowise.gov.uk/page.aspx?o=168584.

12 Lipow, *op. cit. supra* note 10.

13 David Driesen, *The Economic Dynamics of Environmental Law*, MIT Press, Cambridge, 2003, pp. 139–201.

14 Fred Pearce, 'Take Greenhouse Polluters to the Cleaners', *New Scientist* 2519, 1 October 2005, p. 42.

15 Rayner, *op. cit. supra* note 4, Ev 136.

16 Roda Verheyen, *Climate Change Damage and International Law*, Martinus Nijhoff, Leiden, 2005.

17 See, e.g., New Economics Foundation, *Collision Course: Free Trade's Free Ride on the Global Climate*, London, 2000.

18 See, e.g., Working Group on Climate Change and Development, *Africa – Up in Smoke?*, New Economics Foundation, London, 2005; Larry Lohmann, 'Democracy or Carbocracy? Intellectual Corruption and the Future of the Climate Debate', Corner House Briefing Paper No. 24, October 2001, http://www.thecornerhouse.org.uk; Neil Adger, 'Social Vulnerability to Climate Change and Extremes in Coastal Vietnam', *World Development* 27, 2, 1999, pp. 249-69.

19 Elizabeth Malone and Steve Rayner, 'Ten Suggestions for Policymakers', in Malone and Rayner, eds, *Human Choice and Climate Change*, Battelle Press, Seattle, 1998, vol. 4, p. 114.

20 Ruth Greenspan Bell, *op. cit. supra* note 1, p. 3.

21 See, e.g., Robert A. Caro, *The Power Broker: Robert Moses and the Fall of New York*, Knopf, New York, 1974.

22 For 'extraordinarily effective' but often 'forgotten' energy-saving regulation by US states during the 1970s and 1980s, see Lovins *et al.*, *op. cit. supra* note 2, p. 216.

23 On commons regimes, see, e.g., E. P. Thompson, *Customs in Common*, Free Press, London 1990; Ivan Illich, *Gender*, Pantheon, New York, 1983; James Acheson and Bonnie McCay, *The Question of the Commons*, University of Arizona Press, Tucson, 1990; Simon Fairlie *et al.*, *Whose Common Future? Reclaiming the Commons*, Earthscan, London, 1993; Elinor Ostrom, *Governing the Commons*, Cambridge University Press, Cambridge, 1990.

24 Communities in Burma, Malaysia, Nicaragua, Colombia, Nigeria, Chad, Thailand, Bolivia and Ecuador have won the revocation of fossil fuel concessions in their territories. In doing so, they

argue, they've helped to keep some 3.655 billion tonnes of carbon in the ground (Oilwatch, Position Paper: *Fossil Fuels and Climate Change*, The Hague, November 2000).

25 See http://www.grupoadela.org.

26 Kenny Anthony, Prime Minister of St. Lucia, presentation at the Sixth Conference of the Parties of the Framework Convention on Climate Change (UNFCCC), The Hague, 16 November 2000.

27 Swedish Society for Nature Conservation, *The Challenging Communities*, Stockholm, 2000.

28 John Vidal, 'Sweden Plans to be World's First Oil-Free Economy', *The Guardian*, 8 February 2006.

29 D. Knight, 'US Unrivalled as Top Carbon Polluter', Third World Network, July 2001, citing research by the World Resources Institute.

30 Roddy Scheer, 'China Considering Increasing Renewables Commitment by 50 Per Cent', *E Magazine*, 12 September 2005; Victor Mallet, 'China's Chance to Save our Overheated Planet', *Financial Times*, 6 July 2006.

31 Fred Pearce, 'Cities Lead Way to a Greener Planet', *New Scientist* 2502, 4 June 2005; Dan Worth, 'Accelerating toward Climate Neutrality with the US Government Stuck in Neutral', *Sustainable Development Law and Policy* 5, 2, Spring 2005, pp. 4–8; Eli Sanders, 'Rebuffing Bush, 132 Mayors Embrace Kyoto Rules', *New York Times*, 14 May 2005.

32 Miguel Bustillo, 'A Shift to Green', *New York Times*, 12 June 2005; Canadian Broadcasting Corporation News, 'Business Leaders Call for Climate Change Action', 17 November 2005.

33 Point Carbon, 'Sweden Aims to Ban Fossil Fuel Subsidies', 19 June 2006; 'Swedish Parliamentary Committee Calls for EU Ban on Fossil Fuel', 2 June 2006, http://www.pointcarbon.com. For more information on subsidies, see http://www.earthtrack.net/earthtrack and http://www.priceofoil.org. See also Doug Koplow and John Dernbach, 'Federal Fossil Fuel Subsidies and Greenhouse Gas Emissions: A Study of Increasing Transparency for Fiscal Policy', *Annual Review of Energy and the Environment* 26, 2001, pp. 361-89; Doug Koplow and Aaron Martin, *Fueling Global Warming: Federal Subsidies to Oil in the United States*, Greenpeace, Washington, 1998 and Norman Myers *et al.*, *Perverse Subsidies: Tax Dollars Undercutting Our Economies and Environments Alike*, International Institute for Sustainable Development, Winnipeg, 1998.

34 OECD Economic Outlook, *The Economics of Climate Change*, Brussels, June 1998, p. 198, http://www.oecd.org/dataoecd/58/50/29173911.pdf. The figure does not count transition costs.

35 See http://www.oilwatch.org/doc/declaracion/decla2005_montreal-ing.pdf.

36 'Massive US Support for Renewable Energy', STAT Communications, 9 March 2006, http://www.statpub.com. Public support for action on global warming is also very high in other countries whose governments hold a backward position, such as Australia. See Peter Christoff, 'Policy Autism or Double-Edged Dismissiveness? Australia's Climate Policy under the Howard Government', *Global Change, Peace and Security* 17, 1, 2005, pp. 29-44. In the UK, the Science and Technology Committee of the House of Lords found 'deplorable' the government's lack of commitment to supporting renewable energy and recommended large increases: 'We could find no one at the executive level whose responsibility it was to ensure continuity of supply. We were told simply that market forces would solve the problem. We are not convinced...' (House of Lords Science and Technology Committee, 'Renewable Energy: Practicalities', 4th Report of Session 2003-04, Volume 1, The Stationery Office, London, 2004, p. 8).

37 Paul Brown, 'Government's Climate Change Policy is Failing', *The Guardian*, 16 May 2005.

38 Stefania Bianchi, 'Ethnic Communities Challenge Level of Greenhouse Gases', Inter Press Service, 20 June 2005, http://www.gasandoil.com/goc/company/cna52977.htm.

39 'Global Climate Change to Spawn Future Lawsuits', *Rednova News*, 29 May 2005, http://www.rednova.com/news/science.

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51 Lipow, *op. cit. supra* note 10.

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67 Douglas Kysar points out that, on one view, the US has deliberately undermined various international environmental agreements as a prelude to pointing to their 'inefficacy' as a reason for adopting 'market liberalism'. ('Sustainable Development and Private Global Governance', *University of Texas Law Review* 83, 2005, pp. 2109-2166).

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69 The income gap between the fifth of the world's people in the richest countries and the fifth in the poorest took 30 years for the ratio to double from 30 to 1 in 1960 to 60 to 1 in 1990 and only seven years to jump to 74 to 1 in 1997. See http://www.wcc-coe.org/wcc/what/jpc/dossier.html. According to Andrew Simms of the New Economics Foundation, during the 1980s, USD 2.20 out of every USD 100 worth of economic growth reached society's poorest. In the 1990s, this figure fell to USD 0.60.

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Appendix

Climate Justice Now! The Durban Declaration on Carbon Trading

As representatives of people's movements and independent organisations, we reject the claim that carbon trading will halt the climate crisis. This crisis has been caused more than anything else by the mining of fossil fuels and the release of their carbon to the oceans, air, soil and living things. This excessive burning of fossil fuels is now jeopardising Earth's ability to maintain a liveable climate.

Governments, export credit agencies, corporations and international financial institutions continue to support and finance fossil fuel exploration, extraction and other activities that worsen global warming, such as forest degradation and destruction on a massive scale, while dedicating only token sums to renewable energy. It is particularly disturbing that the World Bank has recently defied the recommendation of its own Extractive Industries Review which calls for the phasing out of World Bank financing for coal, oil and gas extraction.

We denounce the further delays in ending fossil fuel extraction that are being caused by corporate, government and United Nations' attempts to construct a "carbon market", including a market trading in "carbon sinks".

History has seen attempts to commodify land, food, labour, forests, water, genes and ideas. Carbon trading follows in the footsteps of this history and turns the earth's carbon-cycling capacity into property to be bought or sold in a global market. Through this process of creating a new commodity – carbon – the Earth's ability and capacity to support a climate conducive to life and human societies is now passing into the same corporate hands that are destroying the climate.

People around the world need to be made aware of this commodification and privatization and actively intervene to ensure the protection of the Earth's climate.

Carbon trading will not contribute to achieving this protection of the Earth's climate. It is a false solution which entrenches and magnifies social inequalities in many ways:

- The carbon market creates transferable rights to dump carbon in the air, oceans, soil and vegetation far in excess of the capacity of these systems to hold it. Billions of dollars worth of these rights are to be awarded free of charge to the biggest corporate emitters of greenhouse gases in the electric power, iron and steel, cement, pulp and paper, and other sectors in industrialised nations who have caused the climate crisis and already exploit these systems the most. Costs of future reductions in fossil fuel use are likely to fall disproportionately on the public sector, communities, indigenous peoples and individual taxpayers.
- The Kyoto Protocol's Clean Development Mechanism (CDM), as well as many private sector trading schemes, encourage industrialised countries and their corporations to finance or create cheap carbon dumps such as large-scale tree plantations in the South as a lucrative alternative to reducing emissions in the North. Other CDM projects, such as hydrochlorofluorocarbons (HCFC) reduction schemes, focus on end-of pipe technologies and thus do nothing to reduce the impact of fossil fuel industries' impacts on local communities. In addition, these projects dwarf the tiny volume of renewable energy projects which constitute the CDM's sustainable development window-dressing.
- Impacts from fossil-fuel industries and other greenhouse-gas producing industries such as displacement, pollution, or climate change, are already disproportionately felt by small island states, coastal peoples, indigenous peoples, local communities, fisherfolk, women, youth, poor people, elderly and marginalized communities. CDM projects intensify these impacts in several ways. First, they sanction continued exploration for, and extraction refining and burning of fossil fuels. Second, by providing finance for private sector projects such as industrial tree plantations, they appropriate land, water and air already supporting the lives and livelihoods of local communities for new carbon dumps for Northern industries.
- The refusal to phase out the use of coal, oil and gas, which is further entrenched by carbon trading, is also causing more and more military conflicts around the world, magnifying social and environmental injustice. This in turn diverts vast resources to military budget which could otherwise be utilized to support economies based on renewable energies an energy efficiency.

In addition to these injustices, the internal weaknesses and contradictions of carbon trading are in fact likely to make global warming worse rather than "mitigate" it. CDM projects, for instance, cannot be verified to be "neutralizing" any given quantity of fossil fuel extraction and burning. Their claim to be able to do so is increasingly dangerous because it creates the illusion that consumption and production patterns, particularly in the North, can be maintained without arming the climate.

In addition, because of the verification problem, as well as a lack of credible regulation, no one in the CDM market is likely to be sure what they are buying. Without a viable commodity to trade, the CDM market and similar private sector trading schemes are a total waste of time when the world has a critical climate crisis to address.

In an absurd contradiction the World Bank facilitates these false, market-based approaches to climate change through its Prototype Carbon Fund, the BioCarbon Fund and the Community Development Carbon Fund at the same time it is promoting, on a far greater scale, the continued exploration for, and extraction and burning of fossil fuels – many of which are to ensure increased emissions of the North.

In conclusion, 'giving carbon a price' will not prove to be any more effective, democratic, or conducive to human welfare, than giving genes, forests, biodiversity or clean rivers a price.

We reaffirm that drastic reductions in emissions from fossil fuel use are a pre-requisite if we are to avert the climate crisis. We affirm our responsibility to coming generations to seek real solutions that are viable and truly sustainable and that do not sacrifice marginalized communities.

We therefore commit ourselves to help build a global grassroots movement for climate justice, mobilize communities around the world and pledge our solidarity with people opposing carbon trading on the ground.

Signed 10 October 2004
Glenmore Centre, Durban, South Africa

Durban meeting signatories

Carbon Trade Watch
Indigenous Environmental Network
Climate & Development Initiatives, Uganda
Coecoceiba-Amigos de la Tierra, Costa Rica
CORE Centre for Organisation Research & Education, Manipur, India
Delhi Forum, India
Earthlife Africa (ELA) eThekwini Branch, South Africa
FERN, EU
FASE-ES/Green Desert Network Brazil 2
Global Justice Ecology Project, USA
groundwork, South Africa
National Forum of Forest People And Forest Workers(NFFPFW), India
Patrick Bond, Professor, University of KwaZulu Natal School of Development Studies, South Africa
O le Siosiomaga Society, Samoa
South Durban Community Alliance (SDCEA), South Africa
Sustainable Energy & Economy Network, USA
The Corner House, UK
Timberwatch Coalition, South Africa
World Rainforest Movement, Uruguay

and, at the time of printing this report, 289 other organisations and individuals.

To sign on to this declaration please send an email to info@fern.org or visit www.sinkswatch.org

Carbon - the New Cash Crop?

While the 2010 Copenhagen climate talks spectacularly failed to reach an agreement on emissions cuts, the summit did see agriculture's role in climate change mitigation officially considered for the first time. Far from being cause for optimism, however, Helena Paul argues that agricultural carbon offsets will result in higher emissions and undermine global food security, biodiversity and ecosystems.

Could carbon offsets for agriculture lead to more energy intensive farming?

Following Copenhagen the message is clear: if we do not act swiftly, industrial agriculture could soon claim large rewards from carbon trading by being recognized as a carbon sink. We know that climate change has the potential to irreversibly damage the natural resource base on which agriculture depends. But we also know that industrial agriculture is a major cause of climate change, so how can rewarding it with carbon credits help reduce its climate impacts?

The journalist Dan Welsh writes: "Offsets are an imaginary commodity, created by deducting what you hope happens from what you guess would have happened".[1] Offsets were originally developed in the US and set out in its 1990 Clean Air Act, as part of its acid rain programme. Limits to sulphur dioxide emissions were set and if an installation kept its emissions below these levels, operators received an emissions allowance which they could use in one of three different ways: to offset another installation with higher emissions, to keep for the future, or to sell to another company. Larry Lohmann of Corner House notes that in Los Angeles "industry successfully lobbied local government to replace existing and proposed air quality regulations with a trading programme." [2]

In 1997, the Kyoto Protocol was adopted, which imposes binding targets upon nations to reduce their emissions of greenhouse gases. In response to US pressure, it includes procedures, notably the Clean Development Mechanism (CDM), which allow high emission countries to buy permits to carry on emitting from others who are reducing (or claiming to reduce) their own emissions. It also permits regional schemes such as the European Emissions Trading Scheme. Lohmann comments:

> "In 1997, through skillful politicking, US elites and their allies were able to insert special clauses in the Kyoto Protocol which allowed northern countries to meet part of their emissions targets by trading carbon dioxide with each other. The cover story was that this would make cutting emissions more efficient."[3]

Thus carbon was turned into a commodity for trading internationally as carbon offsets. And having deftly turned the climate discussions into a commodity market, the US then declined to ratify the Kyoto Protocol. Now some countries are trying to destroy the protocol and with it all mandatory emission reduction targets for industrialized countries, while transferring the market parts of the protocol to the Climate Convention (the United Nations framework for international climate negotiation), which does not impose binding targets.

Offsets Delay Emission Reductions

It is clear that we are not just dealing in a virtual commodity that provides staggering opportunities for creative accounting and the risk of a sub-prime carbon market. Worse still, trading in offsets is delaying emission reductions in industrialized countries while rewarding polluting industries in the South. For example, Steffen Böhm in *The Land* 7, reported how a highly unsustainable and land-hungry paper mill in Uruguay is being subsidized, through the Clean Development Mechanism, because the waste from the mill is used to generate "zero carbon" energy.[4] According to an article in *Euractiv*, 22 April 2009, "The EU's emissions trading scheme has so far failed to deliver any reductions in CO2 emissions while at the same time strangling energy-efficiency investment in the electricity sector, according to a former European Commission official."

This means that, as far as climate change is concerned, offsetting (remember the prompts from airlines to offset your emissions by planting trees?) is possibly the most destructive activity we could undertake, because it hampers action to reduce emissions. This fact was highlighted by a report from the UN and World Bank-sponsored International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) which emphasises that emissions cuts, as opposed to offsets, are the most effective way to protect the natural resource base on which agriculture depends: "the earlier and stronger the cuts in emissions, the quicker concentrations will approach stabilization."[5]

However, countries with large, powerful agricultural sectors such as the US and Australia are going in the opposite direction.

http://carbonfarming.wordpress.com

Carbon Offsets are, according to many, tantamount to Carbon Farming; farming purely for the incentive of offset payments.

They are considering domestic offset programmes that would use their own agriculture to offset their own industrial emissions – without even requiring the agriculture sector to reduce its overall emissions. Australian journalists Guy Pearse and Gregg Borschmann, covering the Copenhagen talks, noted that such a programme could be:

> "enough, some say, to make Australia 'carbon neutral' for the next three or four decades. And all that without having to impose a nasty tax, set up a complicated emissions trading scheme or clean up a single polluting pipe."[6]

Now it appears that the EU is also considering whether land use activities should count towards its greenhouse gas reduction commitment. Such programmes could further marginalize the CDM. So much for the idea that carbon trading will assist the global south.

Undermining the UN Process

At Copenhagen, attempts to develop initiatives such as the Copenhagen Accord among a small group of countries, and foist them on the rest, led to a major breakdown of trust. On 16 December 2009, the Global Research Alliance on Agricultural Greenhouse Gases was launched by US Agriculture Secretary Tom Vilsack. The US Department of Agriculture (USDA) will play a major role in contributing research to this alliance, and a glance at the leading members and the stated priorities suggests it will promote trading in industrial agriculture and soil carbon. The New Zealand government, which hosted the first full meeting in April 2010 spoke of the advantages of working outside the UN.

Back in 1997, parties to the Kyoto Protocol originally ruled that soil carbon sequestration and the prevention of deforestation were not eligible for credits under the Clean Development Mechanism. Furthermore, afforestation and reforestation (a term misleadingly applied to industrial tree plantations) are currently only eligible for one per cent of offsets. Over recent years however there has been increasing pressure from, among others, large scale agri-business to remove all these limits to offsetting and make soil carbon sequestration and agriculture eligible for carbon trading.

There are already several agricultural methodologies under the CDM, and offsetting projects do exist, though they may not be quite what you're expecting. In 2007, half of all CDM projects in Mexico involved industrial pig farms which were deriving biogas from manure, while in Malaysia, 90 percent benefited palm oil companies using their effluent to generate electricity. Such projects merely give a green tinge to large, rapidly expanding and destructive industries. And this is a situation which is set to worsen. CDM methodologies for agrofuels, for charcoal from industrial tree plantations and for pig-iron production, have recently been adopted by the CDM Board and new ones are constantly being proposed. Thus it appears that the CDM is neither clean, nor about development, but a mechanism for continuing business as usual and rewarding existing polluters.

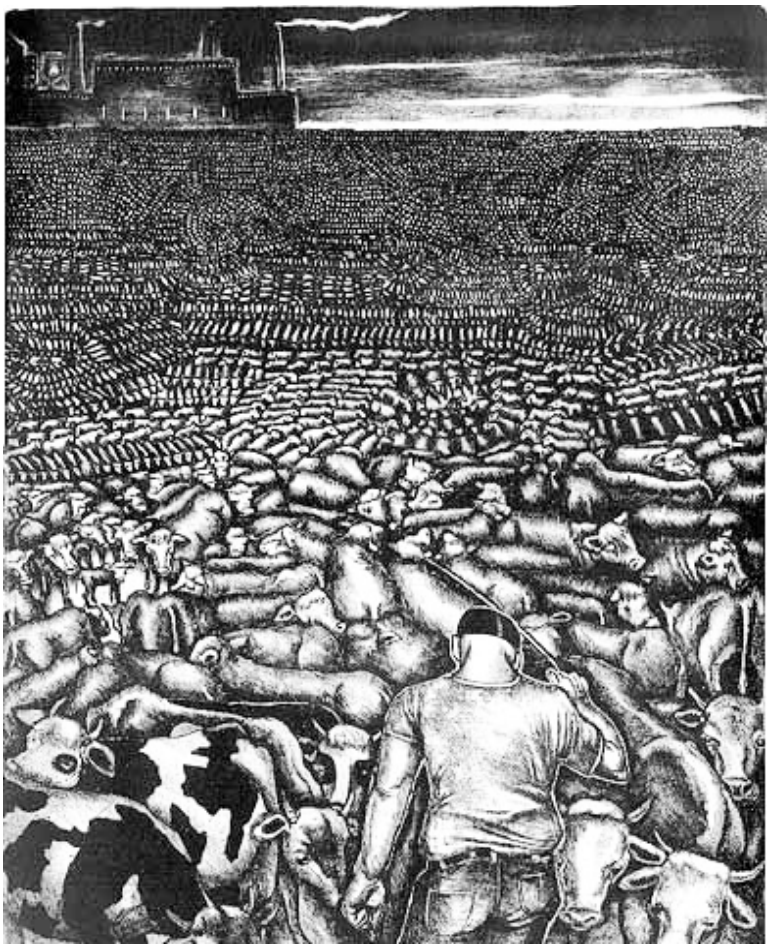
The Primary Suspects

The following are some of the activities and technologies which the agribusiness industry hopes will qualify for carbon subsidies and serve as a vehicle for governments to offset their fossil fuel carbon emissions.

No-till agriculture (also sometimes misleadingly called "conservation agriculture") Soil carbon emissions are supposedly reduced by not tilling the soil. Instead of being ploughed in, weeds are generally killed off through the application of herbicides. Genetically modified (GM) crops tolerant to herbicides obviously lend themselves to this approach. Existing no-till systems across South America and the US, covering millions of acres, have been shown to have a harmful effect upon biodiversity, ecosystems, health and climate. Furthermore, according to the IPCC and Rothampsted, the superior carbon sequestration capacity of no-till soils compared to other management systems is not proven. Emissions of the greenhouse gas nitrous oxide could increase under no-till to the point that they negate any savings made through carbon sequestration.

Agrofuels. After initially being promoted as the answer to emissions from transport, agrofuels are increasingly questioned. Nonetheless they continue to attract subsidies and are supported by targets in the EU, US and other countries. We are now told that the next generation of agrofuels, using the whole plant or tree, will address concerns about competition with food production, since they will be produced from non-food crops; but these "advanced agrofuels" are dogged with uncertainties and require large areas of land.

Biochar is fine-grained charcoal containing pure carbon. The International Biochar Initiative (IBI) argues that turning large volumes of biomass into charcoal and burying it in the soil would create a reliable and virtually permanent carbon sink, mitigate climate change, and make soils more fertile. However, even studies by scientists who are members of the IBI indicate high levels of uncertainty and the need for a lot more research. For example, what percentage of carbon would remain in the soil, for how long, and how much would be turned into CO_2 and emitted again? The production of biomass for both biochar or agrofuels was long assumed to be "carbon neutral" because greenhouse gas emissions during combustion are supposedly offset by CO_2 absorption during new growth. This assessment is now widely rejected. Among other things, it ignores the emissions from conversion or degradation of large areas of land needed to produce the quantities of biomass required. However, the fact that both biofuel (energy) and biochar (carbon) can be derived from the same biomass and thus operate as co-products, attracting more support and increased income or subsidy from the carbon trade, makes them attractive to business, regardless of whether or not they are effective.



Feedlot by Sue Coe

Confined Animal Feed Operations the future of environmentally sensitive farming?

Industrial livestock production is a major emitter of greenhouse gases, mainly nitrous oxide and methane. Grain feed production (such as no-till GM soya in Argentina) currently uses one third of global cropland and often relies on the chemical fertilizers that are responsible for a significant proportion of anthropogenic nitrous oxide emissions. Yet commentators, ranging from the UK government to the Food and Agriculture Organisation and the UN Framework Convention on Climate Change, advocate further intensification and enclosure of animal production in industrial feedlots to mitigate climate change. They note that the waste from the animals can be used to power biogas digesters and describe the whole process in terms of inputs, outputs and efficiency. A study commissioned by Meat and Livestock Australia claims a reduced carbon footprint for feedlot beef. Researchers from New Zealand propose genetically engineering clover to reduce methane emissions from cattle.[7] But subsidizing measures such as these will only serve to increase meat consumption, when the imperative is to decrease meat consumption in rich countries to sustainable levels.

The GM biotech industry sees climate change as a welcome opportunity for expansion and is lobbying for GM to be recognized as offering solutions to climate change problems though they have not yet been formally proposed as such. As well as being used in no-till systems, hundreds of patent applications have already been made for so-called climate ready GM crops. Ideas include extending the geographic and climatic range of crops and their capacity to tolerate salt, drought, heat and floods, as well as engineering crops to use less fertilizer. In fact, such crops have been heralded since the 1980s as a means to combat hunger, but none have yet appeared. Other projects include trying to genetically engineer algae for fuel production as well as micro-organisms and enzymes to help to break down biomass into agrofuels and other fossil oil substitutes, although the consequences of their potential escape and multiplication in the environment are incalculable. There are ambitious plans to develop a new "bioeconomy" based on using biomass to produce fossil oil substitutes in giant biorefineries.

Land Grabs for Offsets

Projects such as agrofuels, biochar and enterprises such as paper mills and palm oil plantations require large areas of land. Carbon offset markets advertise themselves as focusing on initiatives located on "marginal", "degraded" or "waste" land, suggesting that there are millions of hectares just begging to turned to good productive use. However, what is described as marginal land is often used by marginalized and economically weaker sectors of communities, especially women. It may be communal land, used collectively for centuries by people who frequently have no legally recognized title, even though for them it is a vital resource for water, feed, food, medicines, fuel

and income. Such land is also essential for biodiversity, water supplies, soil and ecosystem regeneration.

The pressure for agricultural offsets is also partly responsible for a worrying increase in international land-grabbing since 2008. Private and state-owned enterprises in China, India, Korea, Vietnam and many oil-producing nations are competing to acquire land in Africa to supply food and agrofuels. Countries targeted include Ethiopia, Mozambique, Zambia and Tanzania as well as conflict-torn Sudan and the Congo. Even though some deals may fall through, the impacts on local people are likely to be serious and potentially irreversible.

What Is the Alternative?

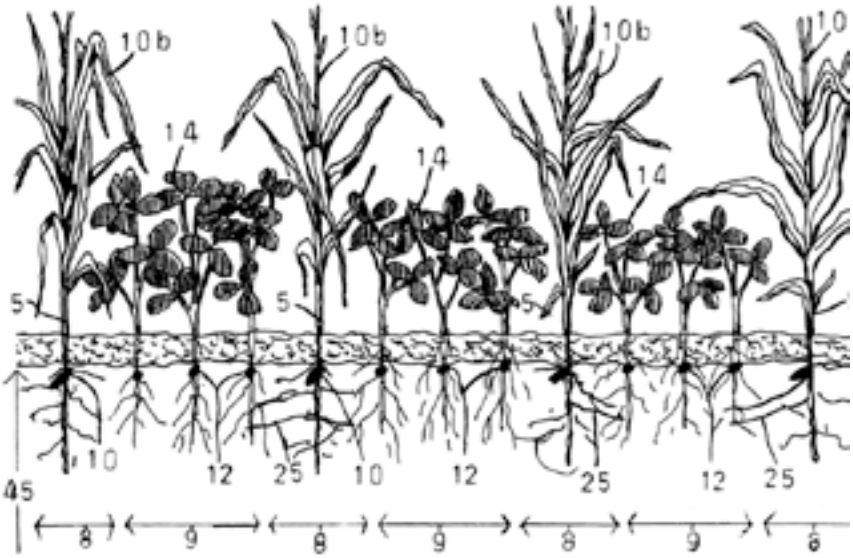
In addition to threats to their land, and policies that are hostile to their interests, small farmers also face further erosion of the resources they depend on through climate change. Yet their practices and knowledge can help to stabilize climate, conserve water, protect soils and secure food supplies. The IAASTD report emphasises the multifunctional role of agriculture and the importance of empowering, not marginalizing, farmers, especially women farmers, and the need to recognize them as producers and managers of ecosystems. Resilient ecosystems are fundamental to addressing climate change, water scarcity and food insecurity. Yet increasing numbers of farmers are forced off their land, and once the link between communities and ecosystems is broken it may be impossible to restore.

The right kind of agriculture could help to stabilize climate as well as feeding us. In the 1980s, peasant farmers in South America, many of them indigenous people, produced around 40 percent of food consumed on that continent. Many of them still use mixed cropping systems (for example, combining peanut with sorghum or millet) which give greater yield stability in drought than monocultures. They have also been shown to have higher yields than equivalent monocultures. They maintain rather than deplete resources, build topsoil and retain nutrients and moisture in the soil. They also enhance crop genetic diversity, a crucial insurance against climate change and seasonal variability. Such systems still account for close to 20 per cent of the world's food supply, in spite of all the attempts to marginalize and suppress them.

Biodiversity and resilient ecosystems are vital for a stable climate, and small-scale, diverse farming within an ecosystem approach is the best way forward. Instead of being lost or expropriated and patented, agricultural biodiversity must stay in the hands of those who make their livelihood from it, and its erosion must be halted. Farmers need the freedom to use biodiversity without patent barriers and they should decide the direction of research, not be the victims of it. Information that concerns them should not be witheld by corporations on the grounds that it is commercially sensitive. On-farm conservation, involving traditional knowledge, participatory plant breeding and community seed banks, is vital. The collective right of farmers and small breeders to seeds, breeds, land, water and soil should be legally recognized. Policies should endorse the multi-functional nature of agriculture and embrace a broader, richer concept of productivity.

There are some who argue that carbon trading would yield useful funds for sustainable farming activities, claiming that since organic farmers sequester more carbon than others, they should be rewarded for this. However, it is more likely that the large corporations, with their influence and economies of scale, based on massive assumptions about how much carbon their industrial systems can sequestrate, would seize most of the benefits.

Industrial farming degrades soils and destroys ecosystems, livelihoods and biodiversity, including the huge range of crop varieties that people have developed over millennia. It is hungry and thirsty, devouring soil nutrients and accounting for some 70 percent of global water-use. It is currently compounding the impact of climate change and destroying the natural resource base aggressively. Yet, industrial farming methods could soon claim large rewards from carbon trading by being recognized as carbon sinks — unless we are vigilant.



Intercropping soyabeans and maize has the potential to exploit different growing niches, increasing yields and undermining the need for intensive monocropping, as illustrated here in a promotional leaflet from the Jamaican Ministry of Agriculture.

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CHAPTER 9

Banking on Biodiversity

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Protecting the world's biodiversity requires answers to a few not entirely rhetorical questions: Assuming agreement of the need to protect Earth's biological wealth, how much would you be prepared to pay to protect an endangered fly? Would you spend $1.50, $15, $150,000, or more? How about society as a whole, how much should society spend on the protection of this fly? Does the answer depend on the nature of the fly itself? On its role in the ecosystem? Or is the calculus based on something else—perhaps on what you must give up to save the fly, or your standard of living, or your priorities?

The questions may seem crass and materialistic—and in some ways they are—but they are essential if the world is to conserve the species and ecosystems that sustain humankind. The reason is simple: like many other important matters, the staggering loss of biodiversity is really a matter of values—and not just the principles that allow people to distinguish right from wrong, but also the more mundane concept of economic values.

In a way, the issue boils down to the fact that the world is losing species and ecosystems because the economic system has a blind spot. It sends signals that cutting down a rainforest to grow soybeans or palm oil plantations makes more economic sense than leaving that forest intact. It says that building a shopping mall to sell iPods is more valuable than having a wetland that buffers coasts against storms, filters water, and provides nesting ground for birds. Is it, therefore, any surprise that people take such signals seriously?

Or, to put it another way, the fact that the U.S. suburban landscape appears to have more bowling alleys than wetlands is simply a symptom of an economic system that has its values—used here in the sense of its prices—wrong. It is what economists call a problem of externalities. Some values—like

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that of a species of woodpecker or of a particular ecosystem such as a rainforest or a wetland—do not enter into the economic system. They are external to it, and so they are not taken into account when economic decisions are made.

Indeed, for eons the price of nature has been woefully close to zero. Supply outstripped demand, and priceless came to mean worthless. But that equation is changing. Priceless nature is becoming increasingly scarce (see Box 9–1) and therefore needs to be made valuable once again. Giving some economic value to biodiversity would make it easier to protect. At the very least, standing rainforests would not compare so unfavorably when considered against soybean fields and palm oil plantations. Their value would no longer be zero.[1]

It may sound strange, even counterintuitive, but the solution to the loss of biodiversity may actually lie in the very same markets that appear to be causing the problem. It may lie in creating payment schemes for biodiversity, mechanisms that give nature a value and that force the economy to look into its blind spots. Luckily, a good number of countries—from Australia and Brazil to the United States—have been experimenting with such schemes, sometimes for more than 20 years, and there is much to be learned.

Countries use a variety of mechanisms for giving value to ecosystems and the services they provide. In essence, these can be summarized as follows:

- *Government sets the price*: This is done either by fining those who damage the ecosystems (through endangered species laws, for instance) or by paying those who conserve it (providing tax breaks or subsidies for conservation, for example). While these systems are useful and play an important role in protecting biodiversity, they suffer from a fundamental flaw: they do not send the right signals to the economy; they do not permit society, via markets, to determine and understand the actual value (the price) of biodiversity.
- *Voluntary transactions set the price*: Users of ecosystem services voluntarily agree on the value with those who provide the services. These "self-organized private deals" are sometimes mislabeled as "markets," but true markets depend on multiple buyers and multiple sellers meeting regularly to exchange goods and services. In contrast, in most cases these are one-time-only deals. They may also take the form of "voluntary biodiversity offsets," in which an individual or company that damages biodiversity pays to "protect, enhance, or restore" an equivalent amount of biodiversity somewhere else.
- *A hybrid system sets the price*: In this case scarcity of a traditionally "public" good is established through government regulation, which then forces buyers and sellers to negotiate in order to set a price for the good or service in question. Examples of this include various "cap-and-trade" schemes in the United States for sulfur dioxide and in Europe for greenhouse gases (see Chapter 7). These schemes create true markets because they generate demand for services from multiple buyers and therefore lead to the provision of services from multiple sellers.

This chapter focuses mainly on the third of these mechanisms, regulatory cap-and-trade systems. While government payment schemes and voluntary biodiversity offsets are extremely useful and are likely to account for the majority of global payment schemes for biodiversity in the near future, they tell more about where we are now than where we might be in the future. The new and emerging regulated markets for biodiversity offsets hold the key to that future.

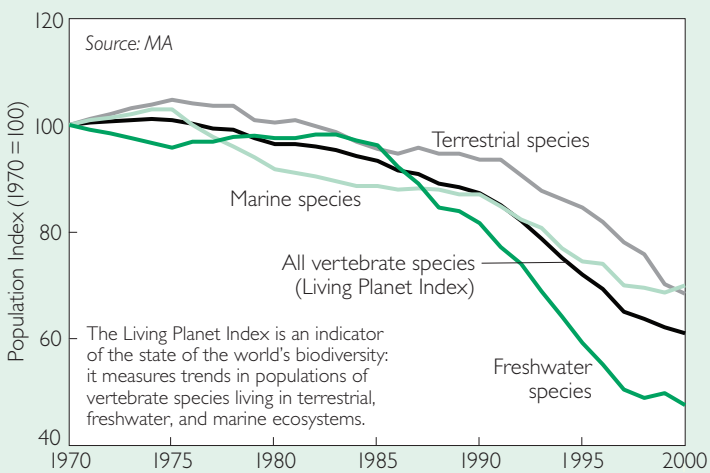
Box 9–1. The Escalating Problem of Biodiversity Loss

The loss of biodiversity is tremendous and disturbing, and it continues to grow at an exponential rate (see Figure)—even though scientists for decades have been saying that species and ecosystems are important, that they provide invaluable goods and services, that they keep people fed and clothed and Earth habitable.

The Millennium Ecosystem Assessment, one of the most comprehensive scientific assessments of the world's biodiversity ever undertaken, came to this sobering conclusion: "Human actions are fundamentally, and to a significant extent irreversibly, changing the diversity of life on Earth, and most of these changes represent a loss of biodiversity." The authors cited ample evidence to support their conclusion. For example:

- Virtually all of Earth's ecosystems have now been dramatically transformed through human actions. More land was converted to cropland in the 30 years after 1950 than in the 150 years between 1700 and 1850.
- Some 35 percent of mangroves have been lost in the last two decades in countries where adequate data are available.
- Over half of the 14 biomes assessed have experienced a 20–50 percent conversion to human use, with temperate and Mediterranean forests and temperate grasslands being the most affected.
- There are approximately 100 well-documented extinctions of birds, mammals, and amphibians over the last 100 years—a rate 100 times higher than background rates.
- Some 12 percent of bird species, 23 percent of mammals, and 25 percent of conifers are currently threatened with extinction. In addition, 32 percent of amphibians are threatened with extinction, but information is more limited and this may be an underestimate.

Sociobiologist E. O. Wilson attributes the loss of biodiversity to five forces summarized in the acronym HIPPO—habitat loss, invasive species, pollution, population growth, and overexploitation of species for consumption (essentially overconsumption). While he is correct in singling out each of these forces, they are in many ways interconnected: the first three are byproducts of the last two. They are essentially the result of human numbers multiplied by human greed. And given that human population is expected to go from 6 billion in 2000 to 9 billion in 2050 and that per capita consumption of everything from water and energy to oil and food is growing at practically exponential rates, the pressures on biodiversity are likely to become unbearably intense.



Source: See endnote 1.

The Fly in the Ointment

Before delving too deeply into these issues, however, a story: There is a small town nestled in the sand dunes east of Los Angeles—Colton, California—that provides some idea of the new world that may be emerging as a result of regulated markets for biodiversity off-

sets. Colton is smack in the economic center of San Bernadino county, one of the fastest-growing counties in the United States.

But there is a fly in Colton's ointment of future economic growth. The city is currently involved in a series of legal battles over how much it should be prepared to pay to save an endangered fly: the Delhi Sands Flower-loving Fly, a rather pretty insect that, like a butterfly, hovers and sips nectar from local flowers. This tiny creature has the distinction of being the first fly—and only the seventeenth insect—to be declared an endangered species in the United States.[2]

According to the U.S. Endangered Species Act (ESA), no individual or entity, public or private, can harm an endangered species—not even a fly—without a permit from the government. Thus shortly after this fly was listed as an endangered species, construction of a hospital in San Bernadino county ground to a halt. The hospital had planned to pave over seven acres of occupied fly habitat, but that all of sudden became illegal. The hospital then had to spend $4 million redrawing its plans, moving its parking lot 250 feet, and making a few other minor changes. All so it wouldn't harm a fly.[3]

How much is a fly worth? Do you judge by what the fly does? With this fly, scientists do not know the answer to that question. They know that pollinators, such as this fly, tend to have important and symbiotic relationships with the plants they feed on. In some cases, without the pollinator the plant cannot reproduce. Perhaps the flower-loving fly plays that role. Or it could be a cornerstone species, without which an entire ecosystem could collapse. Or maybe protecting this fly will protect dozens of other species, some of which may not even have been discovered yet. Or maybe not.

E. O. Wilson has written: "I will argue that every scrap of biological diversity is priceless, to be learned and cherished, and never to be surrendered without a struggle." The state of California, in contrast, has a more moderated view. Having determined that the fly should be protected, it decided to let the market decide what it costs to conserve it. And the market determined that the going rate in California for Delhi-sands fly habitat is currently somewhere between $100,000 and $150,000 an acre.[4]

This story is interesting not so much because it is hard to believe that people are buying fly habitat—let alone paying $150,000 for it—but rather because it forces society to answer that crass and materialistic question: How much is nature really worth? Some would argue that the question should not even be asked. And yet society answers this question "by default" every day. Every time people buy soybeans, for example, they are putting a value on the Amazonian rainforests that were cleared to grow them. At least in the case of the fly, the price tag is clear, evident, and visible. If a developer wants to pave over fly habitat, it will cost the company (in today's market) as much as $150,000 an acre.

If that were all there was to this story, the concept of putting a price on endangered species would be quite troubling. It implies that someone could pay the price set by the marketplace and then go ahead and destroy the last surviving population of a species. But that is not what is happening. The $150,000 paid to pave over the fly's habitat is actually being used to protect or create habitat for that same fly somewhere else. It is, in other words, an "offset"—not unlike the carbon offsets people are buying to counteract their greenhouse gas emissions. (See Chapter 7.)

As the money goes into legally and financially protecting the flies forever (at least in theory), in a way it is a market, or at least a market-like mechanism. It puts a value on

endangered species and habitat, turning them into marketable assets. It puts a cost on the fly for those who would harm it, and at the same time it creates a value for those who would conserve it. It is this marvelous alchemy—turning cost into value, liability into asset—that may ultimately allow society to preserve biodiversity. But does it work? And, if so, how does it work?

Wetland Mitigation Banking

Since the mid-1980s the United States has had a series of functioning biodiversity markets worth more than $3 billion a year. This system is currently the largest and most well established experiment on Earth on creating biodiversity markets. Although these are markets and they involve the private sector, it is government that makes these markets possible. The system that makes the flower-loving fly worth real cold, hard cash begins with government regulation. Indeed it has its roots in two very important U.S. laws: the Clean Water Act (CWA) and the Endangered Species Act, both passed in the 1970s.[5]

Although the Clean Water Act is basically designed to prevent the dumping of chemicals into the nation's rivers, it is also in some respects a rather innovative biodiversity law—thanks to section 404, which attempts to prevent the placement of dredged and filling materials into the "waters of the US." Anyone wishing to dredge or fill a wetland considered of national importance in the United States must first obtain a permit through a program administered by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency (EPA).[6]

In considering whether to award this permit, EPA and the Corps are supposed to follow a process known as "sequencing," in which the first step is to determine if the damage to the wetlands can be avoided. If it cannot, the next step is to minimize the damage. Finally, the developer is supposed to offset, mitigate, or compensate for any damage that cannot be minimized. This hierarchy should be considered in all forms of offsets, but it is not usually codified into law. Section 404 of the CWA is an exception.[7]

The law is also quite clear on what is considered appropriate compensation for the damage to wetlands: developers must "create, enhance, or restore" an amount equal to or greater than the amount being damaged in a wetland of "similar function and values" in the same watershed. In some special cases, protecting a similar wetland is considered suitable compensation, though this is rare. The law recognizes that not all wetlands are equal. Someone cannot damage a wetland in California and protect one in New Jersey. In short, the law is trying to ensure "no net loss" of wetlands.[8]

The compensation for any development projects that harm wetlands—whether done by private developers or the government—can be undertaken by the developers themselves or by third parties. And the Army Corps of Engineers and EPA are charged with overseeing this process and making sure the compensation happens.

One of the most interesting repercussions of this law is that there are now private, for-profit, wetland mitigation bankers who make money by creating, enhancing, and restoring wetlands and then selling the resulting "wetland credits" to needy developers. (See Box 9–2.) They buy wetland areas in parts of the United States that are likely to experience economic growth; they work with the Corps and EPA to get "credits" for their "creation, enhancement, and restoration" of wetlands (hence creating a "wetland bank"); and then they sell these wetland credits to developers who find themselves in need of compensation. In other words, wetland mitigation banking

Box 9–2. The Evolution of a Wetland Banker

Steve Morgan is a duck hunter who now makes a living as a wetland banker. He came to this business via a strange and somewhat circuitous route. In the late 1980s, Morgan and a few colleagues bought a piece of land in central California to create a "hunting club," a place where streams and wetlands would attract the ducks they so loved to hunt. Unfortunately for Morgan—or perhaps fortunately—the wetlands that served as a rest stop on the ducks' flyway were also slated to serve as the site of a major highway bypass. Under the U.S. Constitution, the government can force private landowners to sell their land (assuming adequate compensation) when it is deemed in the "public interest." In legal jargon, the law is called "eminent domain."

Naturally, Morgan was furious. But in discussions with the local authorities, he found out that while it was perfectly legal for the U.S. government to strip him of his duck-hunting grounds in order to make a highway, it was not legal—thanks to the Clean Water Act—for anyone to damage the wetland without "minimizing and mitigating" (or offsetting) that damage.

Morgan decided to take advantage of this situation. He bought 315 acres of his neighbor's farm across the street and then "enhanced and restored" the existing wetland complex by removing invasive species and returning water to the system of streams and channels that had in the past been dammed, dredged, or filled (thus attracting his beloved ducks). With the approval of the U.S. Army Corps of Engineers and EPA, he then turned around and sold the wetland credits from this land (for tens of thousands of dollars an acre) to the Department of Transportation that was building the highway on his former hunting club, allowing them to offset the damage to the wetland they wanted to pave over by protecting the restored wetlands on his new property. The end result was that Steve Morgan had created the first "wetland mitigation bank" west of the Mississippi.

Based on this success, Morgan went on to found a wetland mitigation company called Wildlands Inc. Two decades later, this has become a multimillion-dollar business that employs some 100 people and manages thousands of acres of restored wetlands. (It is also involved with species mitigation banking.) In March 2007, Wildlands received a major capital infusion from Parthenon Capital, a private equity investment firm that manages some $1.5 billion.

In destroying his wetlands, the government had upended Steve Morgan's life, but that gave him a whole new way of making a living and pushed him to become an accidental pioneer for a whole new industry.

Source: See endnote 9.

is possible because the government is restricting supply and allowing the market to set a price—a value—on this particular aspect of biodiversity.[9]

In a way, it amounts to governments tinkering with the economic infrastructure in order to protect those aspects of biodiversity that should be valued, the externalities. And it is no small matter: Although there are no reliable figures on the size and value of wetland banking, the best guess is that there are more than 400 wetland banks throughout the United States, that the market for wetland mitigation is worth more than $3 billion a year, and that entrepreneurial wetland mitigation bankers account for about one third of that business. The rest is composed of people doing their own wetland mitigation in order to obtain permits or paying the government or nonprofit groups a fee instead of compensation.[10]

Although wetland mitigation banking has proved to be a rather innovative concept—fueling the growth of a new "nature management industry"—it is important to point out that it is by no means perfect. Like all

innovations, it has come in for some serious criticism. Some of these critiques are really about a reticence to assign a dollar value to biodiversity, reflecting an inherent dislike for the use of markets and capitalist tools to protect nature.[11]

The critics often argue that the only way to protect nature is for government to restrict its use and strongly enforce this restriction. Although there is clearly a place for this type of protection, there are other powerful tools that should be used as well. Besides, without wetland banking U.S. wetlands would be worth little or nothing, and they would continue to disappear under strip malls, airports, and highways. With banking, their loss has at least a very real monetary cost and can generate funds that may actually lead to the creation of new, very similar wetlands. More important, this cost sends a signal: developers who want to develop a site that has wetlands will spend considerably more per acre, so they had better be absolutely sure they must have that particular site.

Two other criticisms do merit concern, however. The first has to do with the fact that it is notoriously difficult to "create, enhance, or restore" wetlands, so the wetland acre used as compensation may be inherently "less valuable" in terms of biodiversity than the acre being damaged. Partly for this reason, many of the U.S. wetland banking systems require that each acre damaged be compensated with two, three, or more acres of wetland "created, enhanced, or restored." It is a form of overcompensation or insurance and, while it alone does not resolve the matter, it does help.

So far the studies on the quality of the wetlands created as compensation are mixed. In one study conducted in Ohio, scientists looked at the 12 oldest of the state's 25 wetland mitigation banks. Although these had been studied and monitored by the Army Corps and EPA, the study found that many were not up to standard when checked against stringent scientific criteria. Indeed, against these measurements only three banks scored in the "successful category," while five passed in some areas and failed in others. The remaining four failed nearly every assessment, functioning more like shallow dead pools than wetlands. More disturbing, none of the government agencies charged with oversight were taking the bank managers to task for this fact. Overall, however, the study found that the banks were most successful when they maximized the areas defined as wetland, minimized areas of open water, and had similar plant and animal life to natural wetlands.[12]

Despite its implicit criticism of banking, the study's author, wetland ecologist John Mack, remains one of the more steadfast supporters of mitigation banking. He says that the conclusion from his study should not be that banking as a concept is flawed but rather that, when done properly, it can succeed. He argues that by using better designs, performance standards, enforcement, financing, and an appropriate watershed approach, wetland mitigation banking can produce high-quality wetlands.[13]

The second important criticism centers on how wetland mitigation banks are monitored and implemented. How is it possible to ensure that an acre of wetland protected today will still be there tomorrow, the day after, and the day after that? There is also a related question: Will funding be ensured to maintain the newly created wetland? To address these issues, the Corps and EPA require that wetland bankers provide both legal and financial assurances that the "created, enhanced, or restored" wetland will last (presumably) in perpetuity. The legal assurances usually take the form of conser-

vation easements (legal restrictions on the use of land) held by third parties (usually a nonprofit or the government). The financial assurances can take a variety of forms. They are either trust funds set up to produce the interest necessary to run the bank or bonds or letters of credit that hold the bank financially liable for the protection of the wetlands.[14]

In addition to these assurances, wetland mitigation banking requires a considerable amount of enforcement and verification. It needs the government agencies overseeing the system to continuously monitor and ensure that the promised wetland protection is delivered. Such "perpetual oversight," however, is costly and is usually very difficult for understaffed and underfunded government agencies. Nevertheless, as the mitigation industry grows it may generate the funds needed to monitor itself.

Despite these warranted criticisms, wetland mitigation is still probably a better system than the alternative—which, realistically, amounted to little or no real protection. Even if there were no wetland banking, roads would still be built, airports would still be constructed, and shopping malls would still go up. Wetlands, in other words, would still be damaged. History shows that society has not been very good at blanket prohibitions on the use of land.

And even if all further damage to biodiversity could realistically be prohibited, the problems of government enforcement and monitoring would still exist. It just would be spread out across tens of thousands of projects, and tens of thousands of acres of damaged wetlands, rather than across hundreds of wetland banks. In fact, numerous government officials report that the existence of wetland mitigation banking makes it easier for them to carry out their monitoring, enforcement, and protection work.[15]

Endangered Species: From Liabilities to Assets

If endangered species are so important, so valuable, why does the economic system see them as liabilities? The perverse unintended consequence of the Endangered Species Act—forcing people to see endangered species as a liability—is nothing new. Ever since the act was passed some 30 years ago people have been complaining that listing an endangered species places an unfair burden on the private landowners whose land harbors these species. In such cases, they argue, the incentive is not to protect an endangered species but rather to get rid of it fast, before anyone knows it is there. (See Box 9–3.) This is what some have called the "Three Ss Approach to Endangered Species Management": shoot, shovel, and shut up.[16]

Critics of the ESA have often used this attitude to argue that the act needs to be revised or even dismantled. But rather than throw the legislative baby out with the bathwater, there are other, less drastic approaches. One of these involves a process known as conservation banking. In the 1990s, people began looking for a better way to accomplish the ESA's objectives—one that instead of penalizing private landowners for harboring endangered species would perhaps reward them.

To do this, they created a system reminiscent of wetland banking. Under this system, landowners with an endangered species on their land can get a permit to harm that species (known as an "incidental take" permit in the euphemistic language of the government) if they can show they have compensated for it by creating habitat for that same species somewhere else. Again, as with wetland banking, this has paved the way for private, for-profit, species bankers to create habitat for endangered species, get credit from the government for any new members

Box 9–3. Perverse Incentives on Endangered Species

Ben Cone is a tree farmer in North Carolina. He owns 7,200 acres of pine forest that he was managing on an 80–100 year rotation. The system made sense for him because he could harvest different portions of his land at different times and take the largest, most valuable trees. And it was good for a wide variety of species that lived on his land. In particular, it was good for red cockaded woodpeckers, which like to make their nests in pine trees that are at least 80 years old. These woodpeckers are endangered, however. So when they were discovered on Cone's land, the U.S. government prohibited him from harvesting some 1,500 acres of forest. This ban alone is alleged to have cost Cone some $1.8 million in lost revenues.

Following the prohibition, Cone did what any rational landowner would do: he started harvesting the trees on the rest of his land on a much quicker rotation schedule (around 40 years). Understandably, he did not want those trees to be still standing after 80 years and thereby become a tempting home for the endangered woodpeckers. It wasn't Cone's preferred modus operandi, since the trees were less valuable and needed to be harvested on a quicker rotation, but he could not afford to have more of his land placed "off-limits" by endangered woodpeckers. And, ultimately, it was bad for the woodpeckers and many other forms of biodiversity that would have probably preferred the more mature (and presumably more diverse) forests made up of 80-year-old trees.

Source: See endnote 16

of that species found on their land ("new" meaning above an initial baseline), and sell those credits to other developers who intend to damage that species' habitat or harm the species somewhere else.[17]

Not much is known about the size and breadth of species banking across the United States, though it appears that there are more than 70 species banks and that these might trade anywhere from $100 million to as much as $370 million in species credits each year. Whatever the size, the use of conservation banking means that species banking, also known as "conservation banking," can turn a species liability into a species asset.[18]

This is just what one company in Colton, California, discovered. While the municipal government there sued the federal government over the Delhi Sands Flower-loving Fly, saying the government had no place regulating where people can build their houses, a sand and gravel company called Vulcan Materials Corporation acquired 130 acres of prime fly habitat—the largest remaining contiguous area of it in the Colton dunes. But instead of hiring lawyers and attacking the fly's endangered species status, Vulcan decided to see if it could make the fly pay.[19]

Working with the U.S. Fish and Wildlife Service and the Riverside Land Conservancy, Vulcan set up a conservation easement on the land, created a management plan for the fly habitat, established a baseline for flies on its land, and obtained the right to sell "fly habitat credits" above that baseline to needy developers. The bank opened in June 2005 and by December had already sold three of its credits. Although Vulcan will not officially release the sale prices, reliable sources estimate that at least one credit sold for $100,000, although they also say the price has now risen to $150,000 per acre, as mentioned earlier.[20]

According to Kevin Klemm, the owner of the development company that was Vulcan's first customer, the credits were worth it: "The Vulcan Materials people were tremendous. They were business-like and accommodating. They didn't waste any time. The bank is

a tremendous value… I spent six years of my life trying to build 18 buildings." And presumably he got nowhere because the government made it illegal for him to harm the flower-loving flies. Now, with a bank from which to buy offsets, he has an option. To people like Klemm, the rapid response mitigation solution now offered by the Vulcan bank is no doubt a blessing.[21]

And Vulcan is not alone. There are now conservation banks in the United States that sell credits on everything from vernal pool fairy shrimp and valley elderberry longhorn beetle to tiger salamanders, Gopher Tortoises, and prairie dogs. As noted, these markets may be worth as much as $370 million a year. The conservation of endangered species has thus become a very real, and very profitable, business opportunity.[22]

Government Programs: Benefits and Drawbacks

Outside the United States, several other countries are also experimenting with regulated biodiversity offsets. (See Table 9–1.) For instance, the Australian states of Victoria and New South Wales either already have or are setting up schemes similar to the U.S. system, although with a few important differences. The BioBanking system in New South Wales has proposed a scheme whereby some areas would be deemed too sensitive for development. These would be "red-flagged" and would ideally be the sites where species banking would occur. In other words, the Australians are looking at addressing one of the main pitfalls of the U.S. system: a lack of broad-based, landscape-level planning to determine which areas are most needed for conservation. For now, it looks like the BioBanking scheme will be voluntary, but the hope is that, since compensation for damage is obligatory, BioBanking will be cheaper than the alternatives.[23]

In the state of Victoria, the BushBroker scheme is mandatory and applies to native vegetation. The principle is simple: whoever harms native vegetation in Victoria needs to offset that damage by creating or protecting the same type of vegetation in the same bioregion. Applying this scheme, on the other hand, is extremely complicated. There are literally dozens of vegetation systems and bioregions, which makes finding the right match a daunting task. To address this problem, the government of Victoria is building a sophisticated computer matching system that it expected would be operational by the end of 2007.[24]

While cap-and-trade regulated offset schemes to protect biodiversity can indeed create real markets and can be extremely powerful when used correctly, they also require strong government oversight, effective legal systems, enforcement of rules and regulations, and robust financial institutions. These conditions may be found in some industrial countries, but they are not the conditions of much of world—especially in those parts that hold most of the world's biodiversity, places like parts of Central and South America, Congo, China, Indonesia, Madagascar, and Mexico. So what can be done in those parts of the world?

Fortunately, the underlying concept behind both conservation banking and wetlands mitigation banking—that is, putting a value on biodiversity—applies in all countries, even if the exact systems for providing these payments may not. Even the U.S. government has a multimillion-dollar-a-year program to help farmers and private landowners conserve. It comes in the form of Farm Bill payments such as the Wetlands Reserve Program, the Conservation Security Program, the Conservation Reserve Program, and the Environmental Quality Incentives Program.[25]

Table 9–1. Examples of Legal Requirements for Biodiversity Offsets

Country or Region	Program	Legislation	Policy goal
United States	Species Mitigation (of which conservation banking is one tool)	Endangered Species Act 1973 as amended and the Guidance on Establishment, Use and Operations of Conservation Banks	To offset adverse impacts to threatened and endangered species
	Wetland Mitigation	Clean Water Act 1972 Chapter 404(b)(1) and the US Army Corps of Engineers regulations (33 CFR 320.4(r))	"No overall loss of values and functions" (1990); "net gain" (2004)
Australia, New South Wales		Green Offsets for Sustainable Development: Concept Paper (2002); Native Vegetation Act (2003) and subsequent regulations (2005); the Threatened Species Conservation Amendment (Biodiversity Banking) Bill 2006	"Net environmental gain"
Australia, Victoria		Native Vegetation Management Framework (2002) and subsequent amendments to related Acts; BushBroker–native vegetation credit registration and trading: Information Paper (2006)	"A reversal, across the entire landscape, of the long-term decline in extent and quality of native vegetation, leading to a Net Gain"
Western Australia		Native Vegetation Act (2003); Environmental Offsets: Position Statement No. 9 (2006)	"Net environmental benefit"
Brazil	Forest Regulation and National System of Conservation Units	Lei No. 4771 of 1965; Lei No. 14.247 of 22/7/2002, Lei No 9.985 of 18/7/2000, Decreto No. 4.340 of 22/8/2002	No net loss of habitat under a defined minimum forest cover for private landholdings
Canada	Fisheries Act	R.S. 1985, c. F-14, Policy for the Management of Fish Habitat (1986), and the Habitat Conservation and Protection Guidelines, Second Edition (1998); see especially Subchapter 35(l) and Subchapter 35(2) of the Fisheries Act	No net loss in capacity of habitat to produce fish
European Union	Habitats and Birds Directive	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora and Council Directive 79/409/EEC	Maintain overall (ecological) coherence of the sites

Source: See endnote 23.

In Brazil, the government requires that a minimum amount of a landowner's territory be kept in forest cover. There is also a law on Brazil's books that requires compensation for damage to biodiversity, although the laws to determine that compensation are not ade-

quately established yet. Similarly, in places as far afield as South Africa, Colombia, and the European Union, laws requiring or encouraging biodiversity offsets are either being considered or already being implemented.[26]

The Chinese government has long had a program known as Grain for Green (the official title translates as the Sloping Lands Conversion Program, or SLCP) that pays farmers to keep forest cover on hillsides. Its aim is to help conserve watersheds and prevent floods, but it also affects biodiversity conservation. This is not a market-based system, however; it is a system of government subsidies and payments. The money comes directly from tax revenues and is redistributed based on certain established criteria. While the SLCP system does help increase the value of standing forests (and has an astounding budget of $43 billion over 10 years), it does not directly link the users of the biodiversity services with the providers of those services. Government mediates the transaction, so the users of the service are not receiving information on the cost of their use.[27]

Private landowners in Costa Rica who protect their forest cover receive a payment from the National Forestry Trust Fund.

Mexico is introducing a similar system. It was modeled on a program for water conservation in the country known as Pago por Servicios Ambientales Hidrológicos (PSAH, or Payment for Environmental Hydrological Services). The PSAH is interesting in that it collects a fixed amount of revenues from water users and then redistributes it to key targeted forested watersheds across the country. The principle here is that by helping protect forested areas in key watersheds, the payments will help support the provision of water-related ecosystem services throughout the country. The program started in 2003 and pays between $30 and $40 a hectare for forest conservation, depending on the type of forest being protected. Currently the program is paying for the management of close to a million hectares.[28]

Building on its success with water services, Mexico has received a grant from the Global Environment Facility to establish a similar program to make payments for biodiversity conservation. The problem with this approach is twofold. First, as in China, the money is coming from philanthropic sources or the government. Second, the payment and the payer are severed from the actual service being received. In other words, while all Mexicans contribute a bit of the money they pay for water to the PSAH, they often do not know they are making this contribution. And the money they pay is not necessarily used in the watersheds that supply those individuals with water. Again, the link between buyer and seller is not direct. This makes it difficult for users of the service to make decisions based on the economic costs of their use.[29]

One of the most talked about payment for ecosystem services programs, as these are often called, is the Pago por Servicios Ambientales (PSA) program created by Costa Rica in 1996. Private landowners in Costa Rica who protect their forest cover receive a payment from the National Forestry Trust Fund. These payments are made at a base rate of $40 per hectare but can vary depending on type of forest cover. Most of the money for this trust fund comes from a tax added to fuel sales in Costa Rica, but this is supplemented by "environmental credits" sold to businesses and other sources of international finance. Between 1996 and 2003, the Costa Rican PSA program had enrolled more than 314,000 hectares of forested land, transferring more than $80 million to landowners in the process.[30]

Once again, this is a government-run program where the user and provider of the biodiversity services are not closely linked. Also, like China's Grain for Green program and Mexico's PSAH, the price per hectare of biodiversity is set by government, not via a direct market-based mechanism. They are in effect government monopsonies (one buyer without competition, the opposite of a monopoly) for biodiversity services, and as such they may be paying too little or (though this is less likely) too much for the conservation of biodiversity. The price is largely arbitrary and based on the government's ability to pay rather than on supply and demand for the service.

Despite these drawbacks, the programs in China, Mexico, and Costa Rica have been extremely successful at giving added economic value to biodiversity and, some observers say, have also been successful in their overall goal of increasing forest cover.

A particularly interesting and different approach to payments for biodiversity services is found in Victoria in Australia. Through two programs there—known as BushTender and EcoTender—the state has established a reverse auction system for providing government payments to private landowners who conserve local biodiversity (among other goals).

The pilot for BushTender took place in Victoria in 2003, and according to Mark Eigenraam, one of its architects, it "used an auction system to distribute environmental funds to landholders who were interested in improving terrestrial biodiversity on their properties. The implementation of BushTender led to 5,000 hectares of native vegetation on private land being secured under management agreements. In economic terms, it created the supply side of a market for nature conservation and generated significant cost savings when compared with previous grant-based systems for distributing conservation funds to landholders."[31]

BushTender's success is now being followed up with EcoTender, in which the state is inviting local landholders to submit competitive "bids" for government funding to pay for improved management of remnant vegetation and revegetation on their properties. "Where BushTender focused on a single environmental outcome (increasing terrestrial biodiversity), EcoTender aims to achieve multiple environmental benefits, including improvements in saline land and aquatic function," explains Eigenraam.[32]

What is interesting about BushTender and EcoTender is that they use government's monopsony buying power to invite bids that effectively serve to discover the "best" price at which biodiversity conservation will be achieved. Nevertheless, the buyer is once again the government using tax revenues, so the connection between the buyer or user of the biodiversity services and the seller is still not direct.

Voluntary Biodiversity Offsets

Beyond government regulation, numerous companies have begun to set up biodiversity offsets voluntarily in places like Qatar, Madagascar, and Ghana because they think it makes good business sense to do so. Like the voluntary carbon markets described in Chapter 7, the number and investment in such offsets is presently modest. But they are likely to become much more widely used as a part of standard business practice. Some observers believe that they could serve as the precursors to larger, more broad-based biodiversity markets in the long term. Essentially, they demonstrate that there can be a business case for investing in biodiversity conservation.

To understand whether, when, how, and where voluntary biodiversity offsets should be

undertaken, the Washington-based nongovernmental group Forest Trends established the Business and Biodiversity Offsets Program (BBOP). This is a partnership of over 50 companies, governments, conservation experts, and financial institutions from many different countries and led by Forest Trends and Conservation International. The BBOP partners believe that biodiversity offsets may help achieve significantly more, better, and more cost-effective conservation outcomes than normally occur in the context of infrastructure development. The program aims to demonstrate conservation and livelihood outcomes in a portfolio of biodiversity offset pilot projects; to develop, test, and disseminate best practice on biodiversity offsets; and to contribute to policy and corporate developments on biodiversity offsets so they meet conservation and business objectives.[33]

Companies undertake biodiversity offsets for one or more of three reasons: they are required to by national legislation (as in the United States, with wetland mitigation banking and conservation banking), they are encouraged to or facilitated by Environmental Impact Assessment legislation or other planning procedures, or they find a legitimate business case to get involved. BBOP staff have identified numerous benefits for companies in doing this; namely, voluntary offsets can help companies:

- ensure continued access to land and capital and to the license to operate;
- bring competitive advantage or favored status as a partner;
- increase investor confidence and access to capital;
- reduce risks and liabilities;
- ensure strong and supportive relationships with local communities, government regulators, environmental groups, and other important stakeholders;
- influence emerging environmental regulation and policy;
- assure "first mover" advantage for innovative companies; and
- maximize strategic economic opportunities in emerging markets (for instance, establishing companies to implement offsets).[34]

Currently BBOP is working with partners on projects in a variety of countries, including Ghana, Kenya, Madagascar, Qatar, South Africa, and the United States, and is exploring projects in Argentina, China, Mexico, and New Zealand. Some of the companies the program is working with or in discussions with include Newmont Mining, Rio Tinto, Shell, and AngloAmerican.[35]

As these experiences mount up, and as case studies become available on best-practice biodiversity offsets, it is likely that both the supply and demand for these offsets will grow. Countries that establish clear policies may improve land use planning and use market mechanisms to create aggregated offset areas that achieve significant conservation outcomes in high biodiversity-value areas.

How Much Is Nature Worth?

Whether through voluntary offset mechanisms, government-mediated payment schemes, or full-fledged markets in offsets, the concept of payment for biodiversity services is beginning to take hold. More important, these approaches are beginning to subvert the current economic model that is blind to the value of biodiversity, to the services that species and ecosystems provide, and to the costs inherent in destroying the natural wealth on which human well-being depends.

The problem these systems are trying to address is self-evident: When iPods are valued over whale pods, the economic system will deliver ever more species of iPods and wipe out yet another species of whales. When wet-

lands are seen as nothing more than mosquito-infested swamps, they will lose out to shopper-infested malls. And as land becomes ever more scarce, the problems will simply be aggravated. The economic system is not broken. It is doing exactly what it was set up to do: deliver more of what people value—or at least more of what the imperfect price signals say people value—and less of what they don't.

As this chapter documents, the solution to the problem may actually lie in using markets and the economic system to our advantage. Imagine how powerful it would be if market forces—the same market forces that have inexorably pushed for the destruction of rainforests and the extinction of countless species—could be used to protect species, to give them a real value in people's everyday decisions of what to eat, what to wear, and what to buy.

To return to the questions at the start of this chapter: How much should society be prepared to spend to protect nature? The answer will in large measure determine whether humanity ends up living in a world of whales, wild tigers, and wetlands or a world of pavement, iPods, and pollution. Better yet, we can hope that through a form of economic jiu-jitsu these market mechanisms will make it possible for the pavement and the iPods to co-exist comfortably with the whales and the wetlands.

Through Structured Environmental Decisions," *Journal of Policy Analysis and Management*, summer 2001, pp. 415–32.

23. Sustainable Agriculture Initiative, at www.saiplatform.org.

24. For better-targeted pricing schemes, see, for example, John J. Boland and Dale Whittington, "The Political Economy of Water Tariff Design in Developing Countries: Increasing Block Tariffs Versus Uniform Price with Rebate," in Ariel Dinar, ed., *The Political Economy of Water Pricing Reforms* (New York: Oxford University Press, 2000), pp. 215–35. For Box 8–4, for a thorough exposition on water subsidies see Kristin Komives et al., *Water, Electricity, and the Poor: Who Benefits from Utility Subsidies?* (Washington, DC: World Bank, 2005).

25. United Nations, *Handbook of National Accounting: Integrated Environmental and Economic Accounting 2003* (New York: 2003); U.N. Statistics Division, "Handbook on Integrated Environmental and Economic Accounting for Water Resources," draft (New York: United Nations, May 2006).

26. See Hamilton, op. cit. note 15, and Kirk Hamilton and Michael Clemens, "Genuine Savings Rates in Developing Countries," *World Bank Economic Review*, vol. 13, no. 2 (1999), pp. 333–56.

27. A. K. Chapagain, A. Y. Hoekstra, and H. H. G. Savenije, "Water Saving Through International Trade of Agricultural Products," *Hydrology and Earth System Sciences*, vol. 10, no. 3 (2006), pp. 455–68.

28. Table 8–2 and payment for environmental services categorization from Smith, de Groot, and Bergkamp, op. cit. note 16.

29. Molden, op. cit. note 2; MA, op. cit. note 10; Organisation for Economic Co-operation and Development, *Water Management: Performance and Challenges in OECD Countries* (Paris: 1998).

30. Molden, op. cit. note 2; MA, op. cit. note 10.

Chapter 9. Banking on Biodiversity

1. Box 9–1 from the following: data and Figure from Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: Biodiversity Synthesis* (Washington, DC: World Resources Institute, 2005), pp. 2–4, 47; E. O. Wilson, "TED Prize Wish: Help Build the Encyclopedia of Life," TED Conference, March 2007; population forecast from U.N. Population Division, *World Population Prospects: The 2004 Revision* (New York: 2006).

2. Eileen Campbell, "The Case of the $150,000 Fly," *Ecosystem Marketplace*, 26 April 2006.

3. Ibid.

4. Edward O. Wilson, *The Diversity of Life* (New York: W. W. Norton & Company, 1992); Campbell, op. cit. note 2.

5. Jessica Wilkinson, Ecosystem Marketplace, discussions with author, 2007.

6. Clean Water Act, 33 U.S.C. § 1251.

7. K. ten Kate, J. Bishop, and R. Bayon, *Biodiversity Offsets: Views, Experience, and the Business Case* (Gland, Switzerland, and London: IUCN–World Conservation Union and Insight Investment, 2004).

8. For more on the CWA and its Section 404, see www.epa.gov/watertrain/cwa.

9. Box 9–2 from Alice Kenny, "Parthenon Capital Fuels Wildlands, Inc. Rapid Growth," *Ecosystem Marketplace*, 23 April 2007.

10. Wilkinson, op. cit. note 5.

11. Deborah Fleischer, "Wetland Mitigation Banking: Environmentalists Express Concerns," *Ecosystem Marketplace*, 25 April 2005.

12. Alice Kenny, "Ohio Study Shows Mitigation Banks Not Living Up to Potential," *Ecosystem Marketplace*, 24 August 2006.

13. Ibid.

14. Deborah L. Mead, "History and Theory—The Origin and Evolution of Conservation Banking," in Ricardo Bayon, Jessica Fox, and Nathaniel Caroll, eds., *Conservation & Biodiversity Banking* (London: Earthscan, in press).

15. Various government officials, discussions with author.

16. Box 9–3 from Ronald Bailey, "Who Pays for the Delhi Sands Fly?" *Reasononline*, 27 July 2005.

17. Ricardo Bayon, "A Bull Market in Woodpeckers," *Milken Institute Review*, 2005.

18. Ecosystem Marketplace figures provided by Wilkinson, op. cit. note 5. A comprehensive database of species banks will soon be available from the Ecosystem Marketplace. See also J. Fox et al., "Conservation Banking," in J. M. Scott, D. D. Goble, and F. W. Davis, eds., *The Endangered Species Act at Thirty: Conserving Biodiversity in Human-dominated Landscapes* (Washington, DC: Island Press, forthcoming).

19. Campbell, op. cit. note 2.

20. Ibid.

21. Ibid.

22. Jessica Fox, "Conservation Banking: Moving Beyond California," *Ecosystem Marketplace*, 2004; Robert Bonnie, "Guest Feature: Bankng on Endangered Specieds Conservation," *Ecosystem Marketplace*, 16 November 2004; Wilkinson, op. cit. note 5.

23. Table 9–1 from K. ten Kate and M. Inbar, in Bayon, Fox, and Caroll, op. cit. note 14, from ten Kate, Bishop, and Bayon, op. cit. note 7, and from Bruce McKenney, "Environmental Offset Policies, Principles, and Methods: A Review of Selected Legislative Frameworks" Biodiversity Neutral Initiative, 30 March 2005. Australia examples from Louisa Mamouney, discussion with author, from Jane Scanlon, "Australians Revving Up to Bank on the Bush," *Ecosystem Marketplace*, 13 September 2006, from Gary Stoneham, discussion with author, and from Department of Sustainability and Environment, State of Victoria, "Bush Broker: Native Vegetation Credit Registration and Trading, An Information Paper," 2006.

24. Wilkinson, op. cit. note 5.

25. Erik Ness, "The Big Red Barn in the Great Green Field: Green Payments and American Agriculture," *Ecosystem Marketplace*, 21 March 2006.

26. Ten Kate, Bishop, and Bayon, op. cit. note 7; Joshua Bishop et al., *Building Biodiversity Business: Report of a Scoping Study* (Gland, Switzerland, and London: IUCN and Shell International Limited, October 2006).

27. Careesa Gee, "Grain for Green," *Ecosystem Marketplace*, 24 February 2006.

28. Ricardo Bayon, "Case Study: The Mexico Forest Fund," *Ecosystem Marketplace*, 2004.

29. Ibid.

30. Cameron Walker, "Taking Stock: Assessing Ecosystem Services Conservation in Costa Rica," *Ecosystem Marketplace*, 21 May 2007.

31. Mark Eigenraam, "EcoTender: Paying for Ecosystem Services, not Lemons," *Ecosystem Marketplace*, 12 October 2005.

32. Ibid.

33. For information on the Business and Biodiversity Offset Program, see www.forest-trends.org/biodiversityoffsetprogram. Note that Forest Trends is the parent organization of Ecosystem Marketplace.

34. Ten Kate, Bishop, and Bayon, op. cit. note 7; list of benefits to companies adapted from ten Kate and Inbar, op. cit. note 23.

35. BBOP, op. cit. note 33.

Global Forest Coalition

To the Executive Secretary of the Convention on Biodiversity

Asunción, 29 July 2011

Dear Sir,

Referring to your invitation to submit information concerning innovative financial mechanisms that have potential to generate new and additional financial resources as well as possible problems that could undermine achievement of the Convention's three objectives, I would hereby like to submit the views of the Global Forest Coalition, a worldwide coalition of over 50 NGOs and Indigenous Peoples' Organizations striving for rights-based, socially just forest conservation.

Sincerely yours,

Simone Lovera-Bilderbeek
Executive director
Global Forest Coalition

Global Forest Coalition, International Secretariat: 2e Schinkelstraat 134, 1075 TT, Amsterdam, the Netherlands, tel: 31-6-23913217, fax: 31-20-6765870, ING Amsterdam account no: 9103230, http://www.globalforestcoalition.org

Submission by the Global Forest Coalition on innovative financial mechanisms

In October 2008, the Global Forest Coalition published an elaborate report on the impacts of market-based conservation mechanisms on Indigenous Peoples, local communities and women. The full report can be downloaded from http://www.globalforestcoalition.org/wp-content/uploads/2010/11/LIFE-AS-COMMERCE2008.pdf

The report is based on 5 in-depth case studies on different market-based mechanisms in Colombia, Costa Rica, Paraguay, South Africa and India. Based on the findings of these case studies, it concludes that market-based mechanisms exacerbate existing inequalities; undermine alternative regulatory systems; favor those with clear land tenure; and are exceedingly difficult to participate in or benefit from for those without the necessary investment capital, expertise, education or personal contacts. Those with more power and influence, in government and industry, are the ones reaping the rewards, most especially in countries where corruption is rife. Communities and Indigenous Peoples, and the women within those communities, are losing from the overall dynamic, and that holds even for those communities that are willing or would like to participate.

The conclusions of the report are attached. These conclusions are fully in line with the main arguments in the submission by Econexus on innovative financial mechanisms and biodiversity offsets, which we fully support as GFC.

We hope these conclusions about the potential impact of market-based conservation mechanisms on Indigenous Peoples, local communities and women will be taken into account in the discussion on innovative financial mechanisms that have potential to generate new and additional financial resources as well as possible problems that could undermine achievement of the Convention's three objectives.

Global Forest Coalition, International Secretariat: 2e Schinkelstraat 134, 1075 TT, Amsterdam, the Netherlands, tel: 31-6-23913217, fax: 31-20-6765870, ING Amsterdam account no: 9103230, http://www.globalforestcoalition.org

Summary of the main findings of the case studies elaborated in the report "Life as Commerce, the Impact of Market-based Conservation on Indigenous Peoples, Local Communities and Women".

Global Forest Coalition, Amsterdam, the Netherlands, October 2008.

The case studies in this publication indicate that market mechanisms can and do have a wide range of negative impacts on local communities and Indigenous Peoples, particularly on women, and even for those communities or Indigenous Peoples willing or coerced into participating in them.

All the case studies support the conclusion that market mechanisms exacerbate existing inequalities; undermine alternative regulatory systems; favor those with clear land tenure; and are exceedingly difficult to participate in or benefit from for those without the necessary investment capital, expertise, education or personal contacts. Those with more power and influence, in government and industry, are the ones reaping the rewards, most especially in countries where corruption is rife. Communities and Indigenous Peoples, and the women within those communities, are losing from the overall dynamic, and that holds even for those communities that are willing or would like to participate.

Those who own land and resources are most likely to benefit

It is often argued that market-based mechanisms, such as carbon trade, will benefit the poor since many of the most valuable ecosystems of the planet are inhabited by Indigenous Peoples and other local communities with few economic resources. However, an often insuperable legal obstacle for many of the world's poorest people is that they do not have the legal deeds or land titles to the lands they occupy. Yet the use of market mechanisms requires clear ownership – knowing who has the right to sell.
The legal 'ownership' and tenure of land is a hugely controversial issue, contested over decades by Indigenous Peoples. In spite of the recently agreed United Nations Declaration on the Rights of Indigenous Peoples, which confirms that *"Indigenous peoples have the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired"* (Article 26), very few Indigenous Peoples have been able to reclaim legal tenure over their ancestral territories. Although some market-based conservation systems do officially recognize the rights of Indigenous Peoples, including their land rights, and thus their right to sell the 'environmental services' of that land, this only applies to officially recognized territories.

Market mechanisms lead to the privatization of vast tracts of land

The increasingly widespread use of market mechanisms related to land ownership is worsening disputes over land, to the detriment of Indigenous Peoples.
In Paraguay, for example, conservation organizations that support the use of market mechanisms to conserve biodiversity have started to privatize part of the ancestral territories of the 17 first peoples of Paraguay. These lands are now declared private reserves under Paraguay's Act 352, which stipulates that private protected areas may not be expropriated or confiscated, thus denying any Indigenous claims to the land.

In addition, private conservation areas are being established on the last remnants of natural areas, in the Mby'a Peoples territories in the East of Paraguay, for example, where there is biodiversity of tremendous cultural value for these peoples. Several nature

reserves have been established in their ancestral territories without informing the communities, let alone obtaining their free, prior, informed consent.
The relationship between communities such as the Mby'a People and the conservationists is further complicated by the role of the State and multilateral aid agencies. With respect to the Mby'a, for example, these institutions are all aggressively promoting the establishment of a protected area that restricts their ancestral rights.

Market mechanisms can lead to the illegal appropriation of resources

In Costa Rica, a country renowned for its involvement in bio-prospecting, the rights of ownership over genetic resources in their ancestral territories and the associated traditional knowledge of Indigenous Peoples and local communities regarding those native species seems to go entirely unrewarded, even though the final marketable 'products' are entirely dependent upon it. The literature reviewed for the Costa Rican case study found no evidence of any specific benefits to local communities, traditional fishing villages or Indigenous Peoples, and limited economic benefits in general.
Whether or not these communities or Peoples would ever have decided to produce and sell commercial products based on their traditional knowledge themselves is a moot point. However, once that knowledge has been appropriated, they no longer have such a choice.

Market mechanisms are throwing land reform programs into reverse

Market mechanisms that involve access to and the benefits that can be derived from land, forests or natural resources are driving up the price of land (in conjunction with the spiralling price of commodities). The case studies in this publication reveal that this is throwing critical land reform programs – the result of decades of campaigning by Indigenous Peoples, in some cases – into reverse.

This is very clear in Paraguay, for example, where lawsuits being brought by Indigenous communities and small farmers are rarely settled in favor of the original inhabitants, even though the National Constitution of Paraguay formally recognizes the right of Indigenous Peoples to their ancestral territories. The Mby'a Guaraní communities' land claim processes, intended to recover their territories, are frustrated by the fact that the current owners of the private reserves now anticipate increased income from the land under Paraguay's PES scheme.

Speculators are buying up land to profit from biodiversity-related market mechanisms

Foreign speculators have started to buy up biodiversity and carbon rich land, in the hope that it will generate profits in the future, through its ability to provide environmental and carbon sequestration services that can be sold, including in the carbon offset market.

This is an option that is only open to those with capital to invest, such as financial institutions and large conservation organizations. Indigenous Peoples and local communities are simply not in a position to initiate this sort of investment.

London-based Canopy Capital, for example, recently launched a project in the Iwokrama reserve in Guyana, with the intention of developing a *"number of investment products in an*

attempt to monetarise the services of the 371,000 ha forest, such as rainfall protection, water resource preservation and conservation of native biodiversity." [1]
Similarly, Sydney-based New Forests Pty Ltd plans to generate income by selling 'forest conservation outcomes' from the Malua Forest Reserve in Borneo, to palm oil developers, energy firms and others. They anticipate yields on their investment in the region of 15-25%.[2]

But even those communities with legal land tenure may not benefit

Some local communities and Indigenous Peoples do have established land tenure, to some if not all of their ancestral lands. This is the case in Paraguay, Colombia and South Africa, for example. But these communities find it hard to participate and benefit on an equal footing, even if they want to; they can actually find themselves worse off for participating.

In South Africa, for instance, certified logging companies are obliged to consult and engage local communities, in part because post-apartheid land tenure arrangements mean that this is the only way they can gain access to more land. The fact that most of the rural land in South Africa is held under non-private forms of tenure means that individuals cannot sell the land as they wish (assuming they would want to do so). Singisi Forest Products, officially a collaborative enterprise involving business, government and local communities, does pay lip service to engagement with communities and even provides some funding in return for their engagement. But that funding is miniscule when divided up between the communities; and fails to compensate for the timber plantations' serious economic, social and environmental impacts. The community also points out that there have been unexpected constraints on the use of community funds (with timber-related projects being favored over local food production, for example).

South Africa also has a highly politicized and publicized program to indigenize the economy, through the government's so-called Black Economic Empowerment (BEE) (itself a form of market mechanism). Yet this is also failing to benefit communities and local people. Parent company Hans Merensky Holdings (HMH) celebrates its links with workers, a rural women's organisation and the Eastern Cape Development Corporation. However, what is rather surprising about these celebrated deals and partnerships is that the community in the South African case study knew nothing about this share-holding on their behalf, nor of any benefits that might have occurred because of it.

As a result of all this, there is animosity and a of lack of trust between the company and the community, based on a deep suspicion that the companies' 'Community Development Programmes' are little more than an attempt to manage community relations, with a view to ensuring access to the communities' land and cheap labor.

Similarly, in Colombia, the PROCUENCA project does not buy land itself, but persuades landowners to allow their land to be used. Still, PROCUENCA is founded on an unequal relationship because local participants lack political and economic power and are thus unable to incorporate negative externalities into the price of the goods and services they

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[1] *Forests: a carbon trader's gold mine?* 7 May 2008, Climate News for Business, www.climatechangecorp.com/content.asp?ContentID=5305
[2] *Can wildlife conservation banking generate investment returns?* Rhett A. Butler, mongabay.com, November 27, 2007, http://news.mongabay.com/2007/1127-palm_oil.html

are selling. This in turn erodes their sovereignty and local self-determination, as the negative externalities are borne by local communities and the environment.

This inequality is exacerbated by a lack of accurate and comprehensive information that might enable communities to participate meaningfully in decision-making. Very few participants understood how the project income, generated by the sale of Certified Emissions Reductions (CERs) on carbon markets, would be distributed; and many had no information about the subject. They either did not understand the issue or failed to discuss it. Some local leaders even expressed ignorance about the existence of CERs. Moreover, although individuals can participate in PROCUENCA and manage their plantations in an autonomous way, it is indisputable that this is conditional upon the constraints imposed by selling CERs on the carbon market. This drives the process, prices and approvals to the point that it creates a high degree of uncertainty, as has been voiced by the FAO (which manages the financial administration of the project). Thus participants cannot tell if the income generated will be enough to cover the loans they have taken out with the project in order to participate in it.

Furthermore, the PROCUENCA project gained access to land and began planting trees *before* it provided training to communities concerning the project's scope, functions, implications and requirements, and on technical aspects such as plantation maintenance. Overall, the role of local landowners in the management of the project is quite uncertain, even though they are the owners of both the land and the CERs.

Indigenous Peoples who want to participate in market mechanisms, and believe they may benefit from them, can find it almost impossible to do so. The bureaucratic know-how required to sell an environmental service is a significant hurdle for people who do not possess legal skills and who might not be able to properly read and write the official language of the country. The relationship between rural poverty and education is linear and most Indigenous Peoples speak a native, non-official, language putting them at a severe disadvantage in this respect. Another concern is that the vast majority of these Peoples of the forests are not familiar with the marketing skills required to sell 'environmental services' such as CO_2 sequestration, especially in complex and often turbulent markets.

These disadvantages mean that communities will almost inevitably be reliant on some external broker or consultant if they wish to participate; and that broker may well be a large conservation NGO. The intentions of these groups may often be laudable, but it would be dangerous to turn these private, often foreign organizations into formal tools for the implementation of national public policies as important as those relating to equitable forest conservation. Aside from simply not having the scope and capacity to help every local community and Indigenous People in any given country in an equitable fashion, these organizations seldom have Indigenous rights or national social development as their primary mission.

The above-mentioned linguistic and technical difficulties are even more marked for women, who constitute the overwhelming majority – 70% - of the world's poor. As they dedicate a substantial amount of their labor to activities that are not financially compensated, like childcare and household activities, and as they are still discriminated against in labor markets all over the world, they tend to have much lower formal incomes than men: women's estimated earned income in comparison to men is 57% in

industrialized countries, 40% in Latin America and South Asia and just 30% in the Middle East and North Africa.[3]

Women also own far less land than men, partly because they are excluded from inheritance in many traditional legal systems. Even in a country like Brazil, where they are not formally discriminated against in a religious or cultural sense, they still own only 11% of private land.[4] In some traditional cultures in other parts of the world, married women cannot own their own land or property at all. Because of this, they have less money and fewer capital assets and are thus disadvantaged in market economies.

Yet market-based mechanisms or projects do little to address this gender discrepancy. The design and implementation of the PROCUENCA project in Colombia, for example, is entirely lacking in a gender aspect that might ensure the full and effective participation of women, a recognition of their role in social transformation and acknowledgment of their contribution to the improvement of living conditions at the family, community and regional levels. The project lacks indicators to identify any tangible benefits that women might derive from it.

According to legal experts, Paraguay's PES law is inequitable because it requires that environmental impact assessments be conducted right at the outset. The prohibitive cost of such assessments immediately excludes many small and medium property owners, who are thereby denied any of the benefits that the PES scheme might otherwise bring them.

In Paraguay, the Nivaclé People of the Mistolar community explored the possibility of increasing their income by selling 'environmental services', within the framework of the PES Act. In 2007, they were fortunate to receive support from the Yvy Pora Foundation (a Paraguayan foundation which provides assistance to NGOs in the field of financial administration) to do the necessary viability studies for decision-making, which they would not have been able to afford on a purely commercial basis. But after two years of hard work calculating and documenting the environmental 'services' their land use activities would deliver, they eventually concluded that there were structural problems in the current PES law that made it virtually impossible for the community to receive compensation from it. The practicalities of conforming to PES requirements – which include presenting proposals and projects; determining the baseline; compliance with the norms on environmental impact assessments and calculating the value of socio-economic convenience of the PES mechanisms for the community - are still far too costly for communities.

Indigenous Peoples have also identified the following related challenges: geographic isolation, discrimination and social marginalization, expropriation of their ancestral territories and lack of land and natural resources.

The large tracts of land that individual landowners hold also have a considerable competitive advantage over collective territory controlled by (sometimes loosely defined) communities, since decision-making is, by definition, a much simpler and swifter process for individual owners.

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[3] *State of the World's Children 2007, Women and Children, the Double Dividend of Gender Equality*, UNICEF, 2006, http://www.unicef.org/sowc07/

[4] UNICEF, ibid.

In India, for instance, community-owned ecotourism initiatives are experiencing similar difficulties in that they are still playing a marginal role compared to schemes developed by large, often global, tour operators. The communities view ecotourism as a way of supplementing their livelihoods. Yet even so it is extremely hard for them to hold their own in this fiercely competitive market. There has also been little governmental support for community-owned initiatives. Quite the opposite in fact: the authorities have tended to promote other versions of tourism as ecotourism, even if they have no semblance of conservation.

The case study in Costa Rica also demonstrates that the private appropriation of traditional knowledge or plants via intellectual property mechanisms is extremely complex, making any sort of informed community engagement very difficult. A further significant issue is the fact that resource 'ownership' is a concept alien to Indigenous cultures and this has also created confusion: how can - and indeed why should - something that has been part of a People's culture, which they have always shared amongst themselves and with others, be appropriated by outsiders?

In the villages of the Ngobe Bugle peoples in Costa Rica, biodiversity is an essential element in everyday life. From it, villagers get medicines, food, materials to develop their crafts, their legends and much of their history. This active traditional knowledge has been shared freely. Today, however, because of the threat that their knowledge is being appropriated for others outside their village, the very act of sharing is being eroded.

Local communities can find themselves saddled with unexpected liabilities

Participation in market mechanisms can also mean that local communities or Indigenous Peoples can find that they are liable for a project's risks, perhaps unwittingly so. To a great extent this depends on whether they are able to participate in initial negotiations on an equitable and informed basis.

The PES Act in Paraguay, for example, raises tricky questions. What happens to the Indigenous Peoples, small farmers and even small and medium property owners that sign contracts to enter into environmental services schemes, if they fail to deliver as specified in the contracts, or if they have to bear the risk of the project failing for external reasons (forest fires, for example)? The answer to this is unknown at present.

Similarly, the South African case study points out that whilst large timber companies can usually absorb the costs of fires and other large-scale damage to forests, individuals planting trees on private farms or communal land, with a view to selling them to timber companies, are unlikely to be able to absorb these costs, especially as the cost of insurance can be prohibitive. Local communities in South Africa have also found their bee-keeping activities are unpopular with the timber company because of the increased risk of forest fires. As 'business partners' they are encouraged to work with the company to use proper bee-smokers. But, if not, the company says that "*The other alternative is to hunt out all beehives and take them out.*" This unsympathetic attitude to communities also demonstrates how easily companies can sidestep the criteria underpinning a market mechanism such as the FSC (which supposedly indicates a company's commitment to maintaining or enhancing the long-term social and economic well being of forest workers and local communities).

The potential implementation of numerous projects to ensure 'Reduced Emissions from Deforestation in Developing Countries' (REDD), which is being discussed within the UN Framework Convention on Climate Change (UNFCCC) negotiations, could have similar impacts. It has been suggested that considerable sums of money, including for local communities and Indigenous Peoples, could be generated, possibly through the inclusion of REDD in compliance carbon markets.

But here again, whatever the sums of money available in the end, it is likely that project owners will have to shoulder the liability for failed projects. Most payments will either be '*ex-post* payments' (paid after the delivery of credits, because of the methodological uncertainties associated with REDD), or will have stringent risk assessments and contractual liability arrangements attached to them. Both scenarios would be particularly onerous for smaller projects, meaning that they have to find start up capital, sell cheap 'temporary' carbon credits or finance expensive insurance policies in case the project fails. Again, there are all difficulties that large companies can deal with much more easily. It has also been suggested that this entire process will marginalize smaller operators into illegality.[5]

The losses experienced by communities may outweigh any losses

Any local communities, Indigenous Peoples and women who opt to participate in market mechanism negotiations or agreements generally start off in a weak negotiating position, because of a lack of linguistic, technical and legal skills and because of an overriding need or desire to improve their financial position. They may also be unaware of the full consequences of any agreements that may be made.

In the South Africa case study, for example, the US$4-500,000 so far earmarked for community development is to be shared by all the communities in all areas where Singisi Forest Products does business. Based on a conservative estimate, there are 300 communities of the case study community's size, so this works out to approximately US$1,500 per community. Thus, even if the money were to be well and fully spent, there is little likelihood that it would in any way compensate for the negative impacts that the timber plantations have on employment and economic and social well-being in the communities, or make up for the land they have lost the use of.

Even though they are FSC-certified, HMH and Singisi Forest Products are failing to make their activities socially sustainable; and the formal involvement of communities does not seem to be stemming the tide of negative economic and social consequences being experienced by local people. Rather, their involvement and the constant hope of financial gain prevents them from speaking out about current woes.

Market mechanisms undermine legislation on local self-determination

Critically, because market mechanisms generate significant levels of profit, both for private companies and national governments, existing and nascent legislation intended to promote local self-determination, especially by Indigenous Peoples, is being sidestepped.

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[5] *Can forest carbon finance stop deforestation?: a critical review of proposed REDD mechanisms*, Ronnie Hall for Friends of the Earth International, to be published in 2008, www.foei.org

In India, for example, the Constitution provides protection to the Indigenous People living in ‘Scheduled Areas’ and gives them the right to self rule, reinforcing their rights to territorial integrity and to decide their own path of development. It forbids the transfer of tribal lands to non-tribals and corporate entities.

It also paved the way for a separate and progressive legal and administrative regime for tribal areas to ensure genuine tribal self-rule, in relation to, for example, the acquisition of land for development projects, the regulation of land use and the construction of buildings. Similarly, *panchayats* have the right to license tourism projects, buildings and activity areas, and to reject a license to the tourism industry if it refuses to cooperate. They are also enabled to monitor tourism businesses in relation to the exploitation of labor and natural resources; and to initiate criminal procedures regarding the exploitation of women and children, including through child labor, by the tourism industry.

However, in practice, local self-government is constrained by the lack of adequate transfer of powers and resources, their inability to generate sufficient resources, and the non-representation of women and weaker sections of the community in elected bodies.

Furthermore, there are several instances across India where ecotourism ventures and activities are promoted without the consent of local self government institutions. Often the *panchayats* only become aware of plans at the implementation stage, when developers seek a token ‘No Objection Certificate’ to go ahead with construction. At this stage, the *panchayats* feel they cannot refuse, because clearances have already been given by other departments. The tourism industry and higher authorities such as the Tourism and Forest Departments have usurped their functions, bypassed due processes and overruled decisions of local self government institutions.

A further example of unilateral decision making by state governments in India is in the matter of allocating land for ecotourism purposes. Whilst diversion of forest land for ecotourism purposes is done only by the Forest Departments, when they themselves undertake ecotourism development activities, non-forest land such as farm or grazing land is leased out to private developers by the governments either by acquiring it from local authorities or simply by leasing it in their name. This even happens in Scheduled Areas, even though it is not permissible under the Indian Constitution.

Similarly, in Costa Rica, the private Institute for National Biodiversity (INBio) has been bio-prospecting in conservation areas. However, according to information given by the executive director of the National Commission for the Management of Biodiversity (CONAGEBIO), a public organ entrusted to deal with requests for access, no authorization has ever been granted to INBio or other organizations or individuals to operate in indigenous territories. Still, some indigenous people have said that at times, people have wandered into their communities in search of plants or asking them about traditional medicines. In other words, there is at least anecdotal evidence to suggest that illegal bioprospecting activities have been undertaken. As NGOs stated many years ago, bioprospecting is like searching for a needle in a hay-stack, yet many Indigenous People know exactly where to find the needle.

Engaging in market mechanisms can alter community governance and create conflict

The decision to engage in an external, monetary mechanism can have significant impacts on communities' internal systems of governance, and can cause conflict both within and between communities.

In Paraguay, for instance, the sale of 'environmental services' could result in grave governance problems for Indigenous Peoples, since it is not always clear if the chief of a community has the mandate to be a legal representative for such contractual arrangements.

Similarly, in Costa Rica, conflicts have flared up in some indigenous villages because some people in the community have chosen to sell medicinal plants or share their knowledge in exchange for financial gain even though this is frowned upon by the rest of the community. It is important to bear in mind that these conflicts are driven by people's need to generate income – and that there are non-indigenous people who are aware of and ready to exploit this situation to acquire the knowledge they seek. These internal decision-making difficulties can be even more pronounced amongst Costa Rican peasants and fishing communities.

Even where there is no conflict, community governance, including over biodiversity, can be impacted. In Colombia, for example, the PROCUENCA project reduces people's autonomy over their own lands, both in terms of which species are planted and how plantations are managed.

The position of women within communities is also likely to be affected, as their interests are more likely to be over-looked in commercial transactions, which are normally closed by men (even if the women previously had the main responsibility for managing the community's forests and biodiversity). Women also have a disadvantageous position in monetary economies in general, as they spend a significant part of their time on activities such as childcare and household management, that are not rewarded in monetary terms. Moreover, they are generally underpaid in the formal labor market, as well as being responsible for providing clean water and other non-monetary goods for the family.

In general, it is worth noting that transforming the current non-monetary economy of the Indigenous communities into a monetary one tends to have profound impacts on cultural and environmental values and traditions.

Market mechanisms have a significant impact on food sovereignty and water security

It is hard to envisage net benefits for communities if market mechanisms are simultaneously destroying their ability to feed themselves and access clean water.

In South Africa, the push to plant more and more timber trees on communal land is a major threat to food sovereignty in the region. The poor soils and low levels of rainfall already pose problems. The extension of timber woodlots of alien tree species into the communities' land means that significant areas of land are being diverted away from food production. These sometimes invasive tree species can also lead to reduced surface water, loss of the biodiversity resources used in traditional medicine and an increased risk

of fire. Meetings with the Youth Forum and some community members also revealed their belief that non-timber community projects are not welcomed by the company.

In the same way, in India, resorts, lodges and hotels have grown up on the peripheries of Protected Areas; and governments acquiring and leasing land to private corporations and entrepreneurs has led to the privatization of common property resources. This has resulted in communities' losing the benefits of forest produce and, in some cases, pastureland.

An increased commercial presence can create additional burdens for local government and rate payers

The appearance of sizeable commercial operations in a neighborhood can also place heavy burdens on local authorities and tax payers.

In the South African case study, for example, meetings with local government officials revealed a deep-seated concern about the demands that the timber company in question places on local ratepayers and local government. Singisi Forest Products is building a giant new US$176 million timber factory cluster at nearby Kokstad, which will replace the older Singisi Mill. The establishment of the larger mill is problematic, however, because it has implications for the municipality's ability to meet both the needs of the people and the company's service requirements.

Kokstad is a poor, rural municipality with a very low tax base. It also lacks basic infrastructure, making service delivery extremely difficult, both logistically and financially. Kokstad also has a poor water supply; and has already had to spend precious finances upgrading its electricity supply capacity to cater for the mill.

Local officials doubted whether the limited benefits of this planned expansion could possibly outweigh the costs, in terms of water and energy demand, that poor, local ratepayers would have to subsidise.

Local communities in India have had exactly the same experience with ecotourism initiatives, with *panchayats* being forced to go beyond their mandate of providing essential public services to local people, without any extra funds being provided from the state government. Thus, for example, the *panchayats* find themselves obliged to cater to the needs of tourists by dealing with the waste (and especially solid waste) left by tourists; and by extending the basic amenities that exist for local people, such as public toilets.

Economically powerful actors dominating conservation policies and priority-setting

Market mechanisms are generally based on negotiation between various participants and are thus influenced by power structures. As such, they are highly attractive to large, influential private companies, who are in an advantageous negotiating position right from the outset.

Additionally, powerful actors are more likely to attempt to influence (or even ignore) the rules of market-based mechanisms, because of the very significant financial returns that might be generated as a result; and some market mechanisms have even been designed so that companies can now buy their way out of infringements of environmental laws. All offer significant financial rewards, attracting all kinds of investors, ethical or not, private and public. Market mechanisms are also particularly attractive to corrupt governments,

since they are both profitable and complex, meaning that new sources of finance can easily be diverted to corrupt officials and their allies.

In Costa Rica, the private Institute for National Biodiversity (INBio) has enjoyed a very close relationship with successive Costa Rican governments, who have worked (effectively on INBio's behalf) to legitimize bio-prospecting at a global level. This close relationship has undoubtedly been beneficial to both sides: the government began to appoint INBio as the country's representative in international relations and INBio's business deals continue to fuel the image of Costa Rica as a country dedicated to conservation.

However, INBio was not the only beneficiary. A communiqué emanating from the Convention on Biological Diversity (CBD) in 2002 used the relationship between INBio and Diversa, then a US-based industrial biotechnology company (now merged and focusing on biofuels), as an example of access and benefit sharing, saying:

"Under the terms of the agreement, Inbio collects specimens using their own techniques and ones provided by Diversa as well. InBio guarantees that this technology will not be used to collect and process specimens for other companies. The entire DNA sequence that InBio isolates for Diversa will become the property of Diversa. All material isolated from these sites remain under the ownership of Costa Rica. Diversa pay the wages and other extras of at least one InBio staff member. It also pays profits to Inbio in the event that Diversa license a product to a customer from samples obtained from InBio. InBio receives access to technology, equipment and the creation of capacity ..."

The benefits to Diversa are clear. But the benefits accruing to INBio are uncertain, especially in relation to benefits that might or might not be generated if products are developed in the future. In terms of immediate benefits, all that is on offer is a staff member, technology, equipment and capacity, all to be used for the provision of genetic materials to Diversa.

South Africa provides a clear example of how easy it is for companies to sidestep market mechanism rules without penalty. Timber workers are becoming poorer and poorer as work is being sub-contracted out. Even though the FSC's Principle 4 requires that companies ensure that "*Forest management operations shall maintain or enhance the long-term social and economic well being of forest workers and local communities"* timber workers in the case study were unequivocal about the fact that remuneration for their efforts was going *down*, and they were seeking better wages, protection against injury on the shop and plantation floor, a pension and health scheme, security of employment and other labor-related guarantees.

Similarly, in Colombia, the case study recorded bitter complaints from the community about forests that were regenerating being classified as 'stubble' so that they could be logged and replaced with plantations as part of the PROCUENCA project. Because of these concerns, and because of attempts to establish plantations in protected areas as part of the PROCUENCA project, the local government of Villamaría eventually decided not to participate in any more direct reforestation activities involving PROCUENCA (although it does sometimes participate in other project activities).

Finally, Paraguay exemplifies the way in which a corrupt government and oligarchy and its business allies can benefit from a market mechanism. Paraguay's Payment for Environment Services scheme is mainly funded with biodiversity 'offset' payments, which

are financed by businesses whose activities have negative environmental impacts elsewhere in the country. An offset margin of up to 10% of the budget of a project is required if an infrastructure project causes significant environmental impacts. In other words, the Paraguayan PES scheme legalizes a broad range of environmental offences.

The Act also absolves landowners that have broken the forestry law (Forestry Act No 422/73), which stipulates that at least 25% of a landowner's holdings must conserve forest cover. According to the law, landowners can also compensate for this violation by buying biodiversity offset certificates. At the same time, those landowners who *have* complied with the deforestation ban and conserved 25% of their land with forest cover are compensated and could receive payment for what were supposed to be obligatory actions to maintain 'environmental services'.

In countries like Paraguay, corruption has been a widely-recognized problem (although Paraguay itself now has a newly installed government with a reputation for honesty and probity). Nevertheless, in countries where corruption is rife it is likely that politically influential groups will enjoy greater access to funding than politically marginalized groups such as Indigenous Peoples and small farmers. Bad governance and market-based conservation mechanisms are a dangerous combination.

In conclusion, the five case studies demonstrate that market mechanisms can have wide-ranging negative impacts on community governance, even for those communities wishing to participate.

Forest Peoples Programme

ADVANCE DRAFT

Forest Peoples Programme

Submission to the Convention on Biological Diversity relating to innovative financial mechanisms and the rights of indigenous peoples and local communities

31st July 2011

Key recommendations:

- ***The CBD should adopt a precautionary approach to its work on innovative finance mechanisms, based on detailed evidence of their potential to contribute to the effective implementation of the Convention***
- ***Existing and innovative finance mechanisms for conservation must adhere to stringent safeguards consistent with CBD standards and the international obligations of countries to uphold the rights of indigenous peoples and local communities***
- ***Proposed GEF safeguard principles on indigenous peoples must ensure close alignment with relevant CBD norms as well as minimum standards enshrined in the United Nations Declaration on the Rights of Indigenous Peoples***
- ***International processes to design a system of information on REDD+ safeguards under the UNFCCC should include, inter alia, information on compliance with CBD standards and work programmes, including elements relating to indigenous peoples and local communities***

This submission to the CBD Secretariat is presented by the Forest Peoples Programme (FPP) in response to the Secretariat's call for information on the potential role of innovative financial mechanisms in the achievement of the Convention's three objectives linked to biodiversity conservation, sustainable use and equitable benefit sharing (pursuant to decision X/3, A, paragraph 8c).[1]

The information provided includes brief assessments of three different finance mechanisms: Payment for Ecosystem Services; Biodiversity Offsets and REDD+. Each mechanism is assessed in relation to its:

(i) possible impacts on the rights and livelihoods of indigenous peoples and local communities
(ii) potential consistency with associated CBD objectives, standards and work programmes.

The final part of the submission presents some general conclusions and recommendations for consideration by the CBD Secretariat and Parties to the CBD. FPP welcomes this opportunity to comment on innovative finance mechanisms and their relation to the effective implementation of the Convention.

1. Payments for Ecosystem Services (PES)

Payments for Environmental or Ecosystems Service (PES) normally involve payments to land owners and managers conditional upon their provision or restoration of one or more ecosystem services (water, watershed protection, soil conservation, carbon storage, biodiversity etc). Parties to PES agreements may make exchanges at the local, national or international levels. Payments may be made through a range of finance mechanisms including user finance (payments by beneficiaries), public finance (government-run schemes and environmental subsidies), market finance (mostly confined to carbon offset trading) and payments of ecological debt between Northern cities and industries to traditional landowners and managers in developing countries.[2]

Most existing PES schemes in Latin America, Asia and Africa are publicly funded through State funds and through international agency grants and loans from multilateral development Banks.[3] Other than carbon trading projects for afforestation, no globally agreed market-mechanisms exist for payments for biological, watershed and climate services, though some NGOs and groups advocate this approach through the establishment of new markets for "eco-utilities".[4] As with carbon trading (see below), such market-based PES proposals are very controversial and face numerous technical, economic, ethical and methodological problems (e.g. objective and verifiable quantification of services).

Several large PES schemes affecting forests and other ecosystems within the territories of indigenous peoples remain at the research and preparation stage i.e. with no defined finance mechanisms yet in place.[5]

Risks and challenges:
Although detailed studies of PES impacts remain limited, emerging lessons show that the sustainability of such schemes can be undermined due to a lack of meaningful consultation with affected and participating indigenous peoples and local communities, a failure to respect the right to free, prior and informed consent (FPIC) and lack of recognition of customary land and resource rights.[6]

Other risks and potential impacts associated with PES finance and projects include local inflation in land prices in areas covered by the scheme that may lead to land grabbing and a reluctance by governments to resolve indigenous land claims (rent seeking behaviour by government and the private sector).[7]

A further possible problem with PES schemes is that the transacting parties might not necessarily be the legitimate owners of the land or may exclude those people and communities whose historical and present behaviour maintains or affects an ecosystem. Thus, there is a significant risk that PES could engender top-down actions by the parties contracting the PES to oblige local people and others to change their behaviour, while reaping most or all the benefits.

PES schemes often seek to change local livelihood practices and so ill-conceived initiatives risk imposing unjust and unscientific restrictions on the livelihoods and customary resource use of indigenous peoples and local communities.

PES finance for national or local conservation schemes may thus have direct implications for fulfilment of country commitments under CBD Articles 10c and 8j through which Parties have duties to respect and protect the customary use and traditional practices of indigenous peoples and local communities.

Like most environmental payment schemes, PES risks generating perverse incentives for unscrupulous land managers who may threaten to damage resources and destroy services if payments are not forthcoming or if payments do not meet a certain level.

Emerging lessons from PES initiatives indicate, *inter alia*, that:

- good legal and governance frameworks and systems for local benefit sharing in order for PES schemes to be sustainable and equitable[8]
- secure land and resource property rights are an essential precondition for generation of local benefits[9]
- where transaction costs for participation in PES programmes are high, indigenous peoples, local communities and small holders may be excluded or receive only modest benefits[10]
- the <u>costs</u> of PES engagement must be looked at to assess potential <u>net</u> benefits for communities/households
- land owned communally can be more effective for enforcement of PES rules and sanctions and may help reduce transaction costs[11]
- Without robust procedures for targeting PES schemes, monitoring and oversight, payments may not help protect biodiversity and local livelihoods
- There is a need for more detailed empirical studies of PES schemes to assess their impacts on local livelihoods and the environment
- making PES schemes financially self-sustaining over the long term remains a major challenge.

Potential opportunities:

There is some evidence that well-designed PES policies and projects formulated with the full participation of customary landowners and communities can deliver biodiversity and local livelihood co-benefits.[12]

Some indigenous communities have reportedly benefitted from forest protection payments under public-funded PES schemes in Mexico, where different communities have chosen to use funds in different ways in support of conservation and community development.[13] In other cases, the livelihood and rights impacts of PES schemes appear to be mixed with some communities enjoying worthwhile benefits and others receiving only modest rewards. Positive outcomes are linked to strong land and resource rights and PES recognition and support for traditional land management practices and customary law.[14]

Well-designed PES programmes affecting the lands and territories of indigenous peoples that are built on early prior actions and measures to respect customary rights and uphold free, prior and informed consent thus have potential to help meet the objectives of the Convention. Such schemes could assist Parties to further the implementation of specific CBD standards such Article 10c through support for customary systems of ecosystem management and community conserved territories.

2. Biodiversity offsets

Proposals for finance for conservation through biodiversity offsets is gaining momentum among governments, large corporations and conservation NGOs. This type of finance mechanism is based on the provision of funds to protect a specific site or habitat in one place as compensation for the destruction or damage to biological diversity caused by a development or commercial activity at another site.

Risks and challenges:
Like carbon offsets (see below), this finance tool is controversial and plagued by complex scientific, legal, ethical and economic problems. Demonstrating that two biological sites are 'equivalent', for example, is fraught with difficulties and vulnerable to abuse and 'green washing'. Clearly, biological diversity in two locations is different in some way and each biological site is to a certain degree unique (i.e. how can one forest be identical to another?). It may be argued therefore that offsets can never truly compensate for the destruction of nature and the end result may well be a net loss of biological diversity.

Studies of existing schemes reveal that the risk of net losses of biodiversity can be exacerbated where the biological "quality" of the offsets is very low (e.g. wetlands exchanged for dead pools of water).[15] Offsetting also risks distracting project developers away from measures to avoid or minimise environmental and social damage at the resource extraction/development site.

Although most initiatives promoting biodiversity offsets suggest that a "mitigation hierarchy" needs to take place (requiring that avoidance and minimisation of environmental destruction is ensured before offsetting is considered),[16] evidence shows that this mitigation hierarchy is not always respected in practice. Studies in Canada and the USA, for example, indicate that rather than avoiding or reducing damage, projects typically skip straight to offsetting.[17]

A further potential problem with offsets is that they could be used to strengthen existing or create new protected areas at other sites that may apply exclusionary conservation approaches at the expense of local people (in disregard for CBD and other standards requiring inclusive and rights-based approaches to protected area establishment and management).

FPP is thus especially concerned that biodiversity offsets may pose serious risks of social harm and rights violations unless rigorous safeguards and due diligence are guaranteed. Such risks are effectively doubled when compared to non-offset initiatives. This is because tenure and livelihood rights must be fully recognised and respected at *both* the site of potential habitat loss or damage and at the proposed offset site. This necessarily requires that extra resources are required for effective due diligence at two sites, which in turn has implications for transaction costs.

The wealth of evidence from resettlement and relocation schemes confirms that seeking to 'compensate' and replace livelihoods lost to development actions is complicated in practice. Effective compensation and mitigation requires long lead times for very detailed baseline studies, meaningful participatory planning and robust mechanisms to respect the right to free, prior and informed consent.[18]

While emerging voluntary standards for biodiversity offsets mention social and rights issues like FPIC,[19] there are genuine risks that policy implementation may be superficial or rushed unless adequate time and resources are dedicated to ensuring compliance (see literature on problems with implementation of voluntary standards in the logging and palm oil sectors).[20]

Given the high risks, potential high transaction costs and the multiple methodological problems associated with biodiversity offsets, this finance mechanism does not appear to be well aligned with the objectives of the Convention.

3. REDD+ and avoided deforestation finance

A global framework for financing REDD+ actions remains under negotiation within the UN climate convention. Meanwhile, existing government and NGO proposals for REDD+ finance mechanisms include international and national forest funds supported through public monies. Other proposals for REDD+ finance mechanisms include payment for environmental service schemes and various market-based mechanisms (including carbon offset markets, rainforest bonds, etc), or some combination of public and market-based funding sources.[21]

Pilot REDD+ funds under the World Bank and UN provide grants for national readiness planning and actions to facilitate possible future market-based finance for national and sub-national REDD+ programmes. At the same time, local voluntary REDD+ projects based on carbon offset trading are proliferating on the ground, often with little or no regulation (see below).

Risks and challenges:
Without rigorous adherence to agreed social and environmental standards both public and private funding for REDD+ pose multiple risks for forest peoples and forest biological diversity.[22] Key risks associated with flawed REDD policies and finance include land grabbing, corruption, elite capture, violation of indigenous peoples' rights, including rights to their customary lands and traditional livelihoods; and destruction of natural forests by afforestation and tree plantation schemes.[23]

Inappropriate use of REDD+ finance in support of flawed legal frameworks in the forest and conservation sectors risks reinforcing unjust colonial forest, land and conservation laws and a return to 'guns and guards' conservation to protect 'forest carbon stocks'. REDD+ funding for defective national REDD policies and strategies could likewise lead to renewed and strengthened central government control over forests.

Such outcomes would potentially violate CBD standards and undermine advances made on rights-based conservation, participation and local governance made under the Convention's Programmes of work on Protected Areas (Element 2.0) and Forest Biological Diversity.

There is a significant risk that indigenous peoples and local communities may be pressured by governments, NGOs and the private sector to 'opt in' in to inequitable carbon contracts that threaten to lock them in to unjust financial and land use arrangements for many years. Without proper screening and independent verification, there is a danger that such arrangements could violate CBD standards (such as articles 10c and 8j) as well as the human rights obligations of REDD countries.

Evidence from the ground from voluntary REDD carbon trading projects shows that these potential adverse impacts of sub-national REDD+ policies and investments are already taking place in some tropical countries (e.g. Colombia, Peru, PNG).[24] FPP field studies indicate that carbon standards and auditing are failing to screen projects against international obligations of REDD countries, and are instead basing sustainability and compliance assessments on outdated national legal frameworks. At the same time, there is much evidence to show that consultation with forest communities by NGOs and government agencies promoting REDD has so far been superficial and that robust procedures for upholding the right to free, prior and informed consent have not been followed (e.g. in Cameroon, Guyana and Indonesia).[25]

As well as the general risks noted above, there are major challenges linked to market finance mechanisms as well as the basic economic assumptions underlying REDD+ policies. Recent studies indicate that use of an opportunity cost model for REDD+ finance, for example, is inappropriate for addressing governance, equity and tenure issues. Other studies show that the use of 'least cost abatement curves' in the design of national REDD finance and actions may impose unfair costs on indigenous and local communities that could threaten their food and livelihood security.[26]

Serious problems also exist with plans to finance REDD through carbon offset markets. Climate justice critics maintain that carbon offsets are a false solution to climate change,[27] while economic studies demonstrate that carbon trading transaction costs are likely to be high and the potential to deliver significant local benefits is limited, with most potential benefits accruing to traders and commercial interests.[28] The vulnerability of carbon trading to large-scale fraud and corruption as well as price instability in international markets is also seen as a major weakness of carbon market finance mechanisms.[29] Given all these difficulties, some REDD policy-makers are starting to recognise that a global forest carbon market is unlikely to develop in the near future and that alternative funding approaches need to be examined.

Alternatives to carbon finance, include proposals to issue 'rainforest' or 'green' bonds on international markets to provide up-front capital for forest businesses involved in forest conservation and development.[30] Proponents of this mechanism maintain that these bonds would minimise risk and potentially attract large investors like pension funds as well as foster public-private partnerships for forest development.[31]

One risk with this approach is that such bonds could be used to provide credit to large-scale industrial logging and plantation companies whose operations are a proven threat to forest biological diversity and local livelihoods. In many countries, logging and timber concessions remain contested and are often superimposed on the customary lands of indigenous peoples and forest dependent communities.

Without proper regulation and control and full respect for land and territorial rights, forest bonds finance mechanisms skewed towards large investors and private sector interests might create land and resource conflicts and land grabbing in developing countries. As currently conceived, it is not apparent how forest bonds (or even 'community forest bonds' as proposed in developed countries) might be used to provide benefits and support for conservation and sustainable use activities of indigenous peoples and local communities with limited capital and income. Indeed, such approaches might risk indebtedness of communities and generate economic pressure on them to enter into inequitable partnerships with large companies to repay bond debts.

Opportunities:
Scientific evidence shows that effective conservation and sustainable use of forest ecosystems is more likely achieved by indigenous peoples and forest-dependent communities than through governmental and commercial interests.[32] CBD objectives could be advanced through effective targeting of innovative and existing REDD finance towards tenure and governance reforms in support of community conservation and forest management. This approach has the potential to yield multiple biodiversity, benefit-sharing, climate and other co-benefits.

Financial support for legal and policy change can be cost effective and would help tackle some of the direct and indirect drivers (such as unjust tenure regimes and perverse incentives) that are causing forest loss in tropical countries.[33] Such targeted finance may also help achieve synergies with other international agreements, including those relating to climate change, human rights and sustainable development.[34]

The adoption of REDD+ safeguards under the UNFCCC likewise offers opportunities to formulate operational standards that aim to uphold obligations and commitments of Parties under the CBD. In this context, ongoing CBD regional consultations on "REDD-plus Biodiversity Safeguards" in 2011-12 could develop proposals for effective adherence to CBD standards, including articles 8j, 10c and 10d and relevant elements of CBD work programmes.

The same CBD work on safeguards should discuss application of important CBD principles and tools to innovative finance, including the CBD's ecosystem approach and the *Akwé: Kon voluntary guidelines for the conduct of cultural, environmental and social impact assessments regarding developments proposed to take place on, or which are likely to Impact on, sacred sites and on lands and waters traditionally occupied or used by indigenous and local communities*.[35]

Conclusions

1. There is little or no solid evidence to show that innovative finance mechanisms such as biodiversity offsets and forest bonds would contribute to achievement one or more of the three objectives of the convention. Available evidence on biodiversity offsets suggests that they might run *against* the objectives of the CBD.

2. Some innovative finance mechanisms remain at the theoretical or conceptual stage or are in their infancy in testing in the field: it is thus difficult to fully assess their potential impacts and effectiveness in supporting CBD objectives. It is therefore of vital importance to gather further details and compile independent case studies on these finance initiatives (if and when they are developed).

3. Targeted finance for participatory and rights-based PES schemes that uphold FPIC and recognise, secure and reward indigenous customary sustainable use systems have potential to advance progress towards the 2020 Aichi Biodiversity Targets, such as Target 18 on traditional knowledge.[36]

4. Robust safeguards, fulfilment of international obligations, effective monitoring and public accountability arrangements are needed at the national and international levels to reduce risks associated with REDD+ finance.

5. Targeted REDD+ readiness finance in support of governance, legal and tenure reforms, including measures to recognise and respect the rights and governance systems of indigenous peoples in line with Article 10c, would help ensure that REDD+ actions and investments meet the objectives of the convention and enable countries to meet their international obligations under the CBD and other environmental and human rights treaties.

6. Existing international support for safeguards and accountability measures in REDD+ finance offer an unprecedented opportunity for the Parties of the CBD to consolidate international norms and principles in support the objectives of the convention.

7. Innovative finance mechanisms including carbon trading and proposals for new markets in environmental services or 'utilities' are highly controversial and need to be subjected to thorough public scrutiny to examine the pros and cons, advantages and disadvantages of these finance tools.

8. The nomenclature and definition of "innovative financial mechanisms" remains unclear within the CBD process. Both need to be refined to assist Parties in further work on this issue at both the international and national levels.

Recommendations

- Given the unproven sustainability of different innovative finance mechanisms, Parties should apply a precautionary approach and avoid decisions and commitments on this topic until reliable evidence is available to demonstrate the usefulness of different funding mechanisms in helping to achieve the objectives of the Convention.

- To assist further work of the Convention on this important topic, COP11 should consider inviting submission of up-to-date and detailed case studies of the impact and effectiveness of innovative finance initiatives

- Measures need to be put in place by Parties and by finance agencies to ensure that all "innovative financial mechanisms" for conservation and sustainable use fully uphold CBD standards and other relevant international norms, including human rights standards

- Ongoing CBD consultations on REDD+ biodiversity safeguards in 2011-12 should enumerate relevant CBD and other applicable international standards to be adhered to by

global, regional, national and other finance mechanisms in order to further the objectives of the Convention and enable countries to fulfil their commitments under the CBD

- At a minimum, standards relating to indigenous peoples should be consistent with the UN Declaration on the Rights of Indigenous Peoples, including requirements for free, prior and informed consent for all finance decisions and investments that may affect indigenous peoples' lands, territories and natural resources

- CBD development of biodiversity safeguards for REDD+ finance should make direct reference to agreed CBD principles and approaches such as the Ecosystem Approach as well as existing innovative CBD tools such as the *Akwe:kon* guidelines on environmental, social and cultural impact assessment

- Work by governments and major groups within the UNFCCC to establish a system of information for REDD+ safeguards should include information on compliance with CBD standards relating to indigenous peoples and local communities

- GEF safeguard principles on indigenous peoples under development in 2011 must ensure close alignment with CBD objectives, norms, principles and work programmes (including Articles 8 j and 10c as well as relevant elements of the work programmes).

- CBD working and expert groups should be tasked with assessing how strategic *targeting* and *sequencing* of existing and innovative international financial flows for environmental conservation and sustainable use can help promote effective implementation CBD objectives and work programmes (including targeted support for indigenous peoples and local communities)

- Upcoming public participatory consultations on the revision and updating of NBSAPs should include open public debate on different finance options for implementation of the CBD at the local and national levels. Such debates should cover a range of innovative options and measures as well as existing tools, including reform of existing tax and subsidies that may be harmful to biodiversity (such as subsidies to fossil fuels) and the creation of tax and subsidies that promote the conservation and sustainable use of biological resources.

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[16] See, for example, http://bbop.forest-trends.org/guidelines/principles.pdf . See also GCP

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