

**The Contribution of Renewable Energies to the fight  
against Desertification:**

**Some lessons learned from projects and programmes  
promoting the use of renewable energy to improve access  
to water and the sustainable use of biomass in the Sahel**

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### Acronyms

CILSS	InterState Committee for Drought Control in the Sahel
CRES	Regional Centre for Solar Energy ( <i>Centre Régional d'Energie Solaire</i> )
PRSP	Poverty Reduction Strategy Papers
NEPAD	New Partnership for Africa's Development
MDG	Millennium Development Goals
NAP	National Action Programmes
NAPA	National Adaptation Programmes of Action
RAP	Regional Action Programmes
SRAP	Sub-regional Action Programmes
UNDP	United Nations Development Programme
PREDAS	Regional Programme for the Promotion of Alternative Domestic Energies in the Sahel
RSP	Regional Solar Programme
RPTES	Review of Policies of Traditional Energy Sector/ Regional Programme on Traditional Energy Sector
UEMOA	Union Economique et Monétaire Ouest Africaine

### Summary

The first programmes and projects to tackle drought and desertification began in the early 1970s following the severe droughts that afflicted parts of Africa and reached their peak in 1973. In a bid to do something about these crises, small-scale experiments were introduced as part of local projects implemented through bilateral and multilateral co-operation. These devised strategies for developing modern and traditional forms of renewable energy to improve the living conditions of populations who were traumatised by drought and the degradation of their land and natural resources.

If one looks now at the various traditional energy projects and programmes that were undertaken across the Sahel, one sees an array of strategies aimed both at augmenting supply, rationalising demand and diversifying both.

The same prescriptions were applied for modern forms of renewable energy such as photovoltaic solar and wind power. The 1990s saw an up-scaling of programmes from local level to major sub-regional programmes that aimed to disseminate enough renewable energies to reach a critical mass and then spread this to remote zones where decentralised electricity supply was a relatively acceptable alternative in the absence of real, rather than superficial reforms of the electricity sector.

Projects aimed at promoting domestic energies by improving biomass management have had rather mixed results, and even when they have had positive effects this has only been after disproportionately large financial investment. The most successful renewable energy projects and programmes relate to photovoltaic pumping. Important lessons have been learned from these projects that could be of use to all renewable energy initiatives conducted in the Sahel.

**Introduction** : *Renewable energy issues are central to the combat against desertification*

1. Desertification is caused by a process of aridification whose harmful effects on human societies include eliminating water resources and biomass. For developing countries in particular, natural resources are crucial for economic exchanges with the rest of the world and, simply, for survival. Subsistence agriculture still plays an important role in attaining food security in these countries. Access to water and biomass and the ability to make use of other resources depends to a large extent of how available energy is. Energy is, therefore, intimately linked to desertification, and broadening energy access is a pre-condition of alleviating desertification and overcoming its deleterious effects. Unfortunately, Africa's low electrification rates demonstrate that conventional energy is too expensive and rarely available, especially in rural areas where the majority of the continent's population still live.
2. There is huge potential for using renewable energies in arid, semi-arid and sub-humid areas of Africa. Already, they are used in many cases as traditional domestic fuels, and they would appear to provide ideal solutions for adapting to the damaging effects of desertification. It is important then, to conduct an overall assessment of the various initiatives aiming to develop these energy forms in, for example, the Sahel, which is the part of Africa most readily associated with drought and famine.
3. The Secretariat of the United Nations Convention to Combat Desertification showed that it considers the energy issue to be at the heart of efforts to fight desertification by jointly organising the Tunis Workshop in 1998 on the Promotion of environmentally-friendly Renewable Energies and Technologies as part of the Regional Action Programme (RAP) to combat Desertification in Africa. The orientations of the direction of the RAP had already been set<sup>1</sup> during the Pan-African Conference in Ouagadougou the previous year on the convention's implementation and since then the value of renewable energies has been asserted on several occasions.
4. "Renewable Energies and Eco-technologies" was one of the seven themes that workshops were based on. For the purposes of this document we will use the more compact term "renewable energies" to convey the definition used at the Tunis Workshop on "Renewable Energies": those energies that cover a range of inexhaustible energies at human scale, all of which derive directly or indirectly of solar activity<sup>2</sup>. In Africa, this essentially refers to six sectors<sup>3</sup>: photovoltaic solar, thermal solar, biomass, wind power, micro-hydraulics, and geo-thermal energy. Five of these six sectors are currently being exploited in Africa (geo-thermal energy being the sole exception). There is a wide variety of renewable energy technologies being developed and experimented on – these technologies are

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1 Cf. the Report of the Tunis Workshop on promoting New and Renewable Energies and Environmentally-sound Technologies as part of the Regional Action Programme (RAP) to fight desertification in Africa, October 1998

2 The Report of the Workshop for Promoting New and Renewable Energies and Environmentally-sound technologies as part of the Regional Action Programme (RAP) to fight desertification (Tunisia 1998) points out that since the World Solar Summit, there is a tendency to bunch almost all form of renewable energies under the heading 'solar energy'.

3 In fact there are more than six renewable energy sectors. In December 1978, the United Nations General Assembly adopted a resolution identifying 14 new and renewable sources of energy that should form the basis of energy transition: solar energy, wind power, biomass and fuel wood, hydro-electricity, geothermal power, tidal energy, asphalt shale, tar sand, peat, animal energy, etc.

sometimes called “eco-technologies”<sup>4</sup>. The uses to which these technologies are put are also diverse and include heating, cooking, drying, pumping, lighting, irrigation, desalination, and mechanisation.

5. Renewable energies are included in the seven themes of the Convention to Combat Desertification (CCD) for three main reasons:

- Renewable energies could form part of viable adaptation strategies for alternative solutions to problems of water and power supply in arid and semi-arid Africa.
- There are several institutions across the continent, which are capable of promoting the use of renewable energy sources as part of efforts to fight desertification.
- Finally, the issue of renewable energies was one of the priority areas most frequently identified for implementing the CCD at national, sub-regional and regional levels.

6. As with many international conventions, the one on desertification does not explicitly specify how its provisions should be implemented. The aim of this document then, is to help devise an effective and relevant implementation strategy. With this goal in mind, we will examine the reality of what people really need and expect in the countries concerned. We will also take stock of the various strategies already implemented in relation to the two priority issues, i.e. renewable energies, and the fight against desertification. Finally, we will draw the main lessons from the original ventures that have been carried out around the Sahel and for which documentation was kept. We will do all of this with a view to raising pertinent questions, suggesting possible ways of answering these questions, and paving the way to future discussions such as those that will be held at the Bonn Conference on Renewable Energies in June 2004.

## **I. The issue of renewable energies in the Sahel**

### **I.1. How renewable energies can guide the search for solutions to problems caused by desertification**

7. Renewable energies offer many very interesting possibilities to the Sahel in terms of alternative strategies or diversifying energy supply. Quite apart from any faddish effect, they promise genuine opportunities to expand and diversify income-generating activities by providing power in a flexible and decentralised manner that conventional programmes such as the current rural electrification ones cannot do in any meaningful way in the short and medium term. Spreading the use of the energies would relieve pressure on biomass and/or make it more available.

8. When it comes to evaluating whether or not renewable energies can help improve living conditions, several questions must be asked: have they significantly broadened access to water, which is, of course, an essential social service and a driver of production? Which renewable energies are the most technically efficient, socially appropriate, financially accessible and, in one word, reasonable?

There is a clear link between current levels of energy consumption<sup>5</sup> in Sahelian countries and the aggravation of their ecological situation, with the former exacerbating deforestation,

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<sup>4</sup> Renewable energies are often linked to “eco-technologies”. The latter may be defined as “all energy –efficient technologies and measures implemented with a view to safeguarding the local environment. It covers all technologies that require a renewable energy source and a “clean” environment. For further details, please see the report of the Workshop on New and Renewable Energies and Environmentally-sound Technologies as part of the Regional Action Programme (RAP) to fight desertification in Africa.

erosion, runoff, soil degradation, reduction of the richness of natural resource capital (biodiversity), etc.

9. We already know one of the vicious cycles that cause or accentuate the spread of the desertification: climate change and variability -> chronic drought -> acceleration of desertification -> perpetuation of drought. A similar debilitating knock-on<sup>6</sup> effect concerns charcoal, which is the fuel used mostly by the poor. Generally speaking, rural populations do not purchase charcoal, rather they cull it from their immediate environment, since it is free and accessible. Getting their hands on modern energy such as electricity or Liquefied Petroleum Gas (LPG) is a lot more difficult – these fuels may be available in cities but their high cost prevents them from becoming widespread. Indeed, these modern fuels are also out of the reach of poor city-dwellers (i.e. the majority of city-dwellers), who therefore tend to consume more traditional energies (principally charcoal). There is a symbiotic relationship between the processes of impoverishment and desertification: the more traditional energies (those used by the poor) are used, the more biomass is cut down or collected. This means the biomass becomes more and more unrenovable and its over-exploitation erodes the ligneous resources and biodiversity, permanently altering the environment. This in turn perpetuates the factors of natural resource degradation and desertification, sealing the devastating cycle of desertification- poverty – excessive use of biomass-fuel (which is free or cheap) - deforestation – desertification. This is both the cause and consequence of many development difficulties.

The thrusts of energy policies or the lack of suitable and coherent energy strategies affect both Sahelian energy systems and their environmental situations.

## **I.2. The role of renewable energies in the Sahel**

10. The majority of renewable energies used in the sub-region are considered to be “solar energies”<sup>7</sup> because though they harness very different phenomena, they all derive from solar activity. Despite the fact that there is great potential to develop all renewable energies in the sub-region, they are not all being availed of to the same extent for the simple reason that the technology required for some has not yet been mastered. In addition, some have higher opportunity costs than others, and some are more inconvenient to use than others (for example, solar and wind power are unpredictable and supply can be intermittent).

11. In the Sahel, it is painfully obvious that the extent to which biomass energy is permanently renewable or not is one of the most significant criteria for assessing the role that renewable energies can play in the fight against desertification. Analysing the impact of water access on desertification is more indirect, though equally critical: water access is a major factor in enhancing living conditions and increasing household production. Having water also means being able to engage in more intensive agriculture and thereby relaxes deforestation, since extensive agriculture leads to abusive deforestation.

12. Since the link between poverty and the process of aridification is abundantly clear, it is obvious that the reverse could also be true: that when peoples’ living conditions and

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<sup>5</sup> The trend is not likely to be reversed in the short or medium term: energy consumption seems set to remain heavily dependent on biomass, resulting in ever-more incursions into ligneous resources.

<sup>6</sup> UICN-BRAO, GWP-WAWP, CILSS: Water, climate change and desertification, Ouagadougou, October 2003.

<sup>7</sup> It is worth remembering that since the World Solar Summit, there has been a tendency to lump all renewable energies together as solar energies. Cf. Report from the Tunisia workshop on New and Renewable Energies, October 1998.

productive capacities improve, they will be more apt to choose energy consumption practices that are economically more rational and which avail of natural resources in a way that allows them to regenerate themselves.

13. Water access and the extent to which biomass energy is renewable are not just two objectively relevant evaluation criteria for measuring the contribution of renewable energies to resolving serious Sahelian problems; they are also two avenues through which the concerns of the Convention to Combat Desertification may dovetail with the priorities of Sahelian countries. The task is to document these various concerns in a way that helps identify methods of fitting them all into a common approach for implementing the Convention to Combat Desertification (adaptation projects).

The first step is to compile the main experiences of promoting traditional and modern forms of renewable energies and note the means used, their geographic spread and the qualitative and quantitative results obtained (II). We will then devote the section on the lessons to examining the type of benefits derived from using each type of renewable energy – effects will be considered benefits if they in some way improve either access to water or biomass management (III). We will then outline elements on which a strategy for Bonn and beyond could be based.

## **II. Some experiences of promoting renewable energies in the Sahel**

14. There are many institutional initiatives aimed at eradicating poverty and promoting development in and for the Sahel, a lot of which have specifically identified combating desertification as an objective, particularly in the aftermath of the crises that scarred the 1970s and severely impaired societies ability to cope with the suddenness and gravity of the problems that all struck at the same time.

15. Development partners provided support, advice and funds for institutions, projects and programmes throughout the Sahel, especially those that sought to tackle desertification, alleviate poverty and/or promote renewable energies.

16. The first wave of initiatives launched through bilateral co-operation (from Japan, Canada and Germany amongst others) included ones that were relatively extensive insofar as they stretched across several countries. The Special Energy Programme by Germany's GTZ is one such example. This provided a local/national energy supply to a handful of countries in the Sahel and used, amongst other things, photovoltaic systems. Another example is the Japanese co-operation service's pumping and desalination project, which exerted a positive but limited effect on Senegal's environment.

17. Regarding multi-lateral co-operation, there were solid partnerships between Sahelian countries and the European Economic Community - which subsequently became the European Union -, the World Bank, and specialist agencies within the United Nations (United Nations Development Programme), etc. For the last 10 years, the UNDP has been implementing the Multi-Functional Platform project, which entails both a bio-energy project (promotion of the use of *jatropha curcas* plant oil as fuel) and another one on rural mechanisation (small motors to be used to providing multi-purpose energy to remote rural areas).

18. Non Governmental Organisations have also got involved in promoting renewable energies either by carrying out pilot actions on the ground or by performing studies,

conducting advocacy to international donors<sup>8</sup>, etc. Some of these efforts, though limited in scope, have yielded very positive results<sup>9</sup>. One good example comes from the *Malian NGO AquaViva*, which implemented energy provision projects based primarily on discharge height and which made great use of photovoltaic and wind power. This project produced significant advantages for both the beneficiaries and the administration.

19. The current aim is to support African governments and societies as they draw up energy policies by retaining an holistic view to ensure these policies incorporate Poverty Reduction Strategy Papers (PRSP), National Action Programmes (NAP), Sub-Regional Action Programmes (SRAP) to combat desertification, National Action Plans for Adapting (PANA) to climate change and other adaptation projects that may be devised and executed as a result of conventions arising from Rio.

## **II. 1. A variety of experiments dedicated to both traditional and modern renewable energies**

20. In 1987, an evaluation report on the European Economic Community's energy aid to Mali<sup>10</sup> expressed alarm at the relatively meagre efforts made to promote domestic fuels as part of national projects despite the fact that most fuels consumed in Sahelian countries are domestic. This observation could have been made not just in Mali but right across the Sahel, since countries were all in similar situations: "the projects hitherto financed by the European Economic Community, or indeed even by other donors, have hardly paid any attention to the ligneous fuels sector (fire wood, charcoal), yet this accounts for a major part of the fuel consumption in Mali and other countries in the region. It is true that there have been a few attempts (particularly in relation to improved stoves) but as yet no serious large-scale energy-saving project has been implemented in the sector of rural or urban domestic fuels. If the current trend persists, a slew of further disturbances in ecological and social systems will intensify rural depopulation and swell cities that are already unable to provide jobs for the many new arrivals."

21. Some large-scale institutional programmes or projects (with sub-regional scope, large budgets, and long periods of application) devoted to domestic energies began to be implemented in the early 1990s. Before then, there were hardly any small development projects in the energy sector. The project for reviewing traditional energy policies in the Sahel, a project that subsequently became the Regional Programme on Traditional Energy Sector - better known by the acronym RPTES (and which focused on domestic energies) – and the Regional Solar Programme (RSP) were precursors of a new generation of initiatives. These were the first major programmes with sufficient scope and span to be considered more than just experimentation. They were applied simultaneously to a host of Sahelian countries for a period of 10 years (the 1990s). The Regional Programme for the Promotion of Alternative Domestic Energies in the Sahel (PREDAS) and phase II of the RSP are the two major programmes that have taken up the baton for the decade that began in 2000; accordingly, traditional and modern forms of renewable energies are being developed at the same time. There is, therefore, justification for hoping that Sahelian countries will eventually

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<sup>8</sup> Not necessarily exclusively.

<sup>9</sup> By limited in scope, we mean the efforts only covered one or a small number of countries and/or they did not have long-lasting effects.

<sup>10</sup> Cf. - FALL Alioune, KHENNAS Smail, SOKONA Youba: Evaluation of Energy Aid from the European Economic Community in Mali, Sussex Research Associates Limited, February 1987.

have national or sub-regional energy policies that harness a range of energy sources and provide optimal satisfaction of the various needs identified.

## II.2. Photovoltaic solar to the forefront of efforts to widen access to water

22. The Regional Solar Programme is unquestionably the flagship programme in the Sahel for developing photovoltaic use – this is the technology that has done most to widen access to water<sup>11</sup>. The RSP's presentation leaflet summarises the Sahelian countries' hopes of turning their harsh climatic impediments into tangible advantages in the following terms: "A contributing factor to drought, the sun now supports development (...) and all thanks to photovoltaic technology<sup>12</sup>."

23. RSP's successes have been down to:

- technological maturity – technology had been tested (for technical reliability, economic viability, etc.) through a slew of projects and programmes carried out in the sub-region,
- necessary resources readily available,
- photovoltaic turned out to be more socio-culturally acceptable than other technologies;
- very appropriate for users' needs.

24. The idea of the RSP was launched in 1986 during the meeting of Heads of State in Praia (Cap Verde). It was then enshrined in co-operation agreements between African-Caribbean and Pacific States and the European Union (ACP /EU). Since Lomé IV, the context has been conducive to strengthening the process of economic integration and regional co-operation, notably through the formulation of Priority Investment programmes and joint implementation strategies aimed at ensuring more positive results on the ground.

25. The RSP has a multi-pronged overall objective. On the one hand, its goal is to help combat environmental degradation (reforestation) by harnessing solar energy, which is in plentiful supply. On the other hand, it aims to improve water access and management<sup>13</sup>. The priority focus is, therefore, of providing drinking water to rural populations, and possible applications of photovoltaic solar in the countryside are legion<sup>14</sup>.

26. The Programme enjoys an almost talismanic image owing to the numerous unprecedented and, indeed, innovative aspects to its approach: it is an essentially efficient mechanism of sub-regional integration, its financing method is original and its budget is more substantial than that of other renewable energy programmes<sup>15</sup>.

27. The results expected from phase one of RSP were to install a relatively large number of equipment in an environment with very low rates of access to services and to see to it that this equipment would remain operational in the long term<sup>16</sup>. The objective of the second

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11 In comparison with other forms of renewable energies and related technologies.

12 Cf. Regional Solar Programme /European Commission /General Development Directorate DGVIII/CILSS /RSP Coordination.

13 It would also have been possible to focus on lighting, air conditioning, refrigeration, communication ,etc.

14 The RSP only assigned very marginal importance to rural electrification as compared to water provision (accessibility in terms of quantity and quality) and in marking economic conditions more amenable to development (irrigation for market gardening). The fact that just 16 of a planned 237 pumps were installed demonstrates that using photovoltaic pumps for small-scale market-gardening is not very practical when the organisational dynamics of the beneficiary communities are not known or adequately considered.

15 RSP is implementing around 34 billion CFA Francs worth of activities.

16 Most installations were of submerged pumps. There was very little demand for other systems, especially surface pumps because they were deemed unviable: out of the 237 provided for in the funding convention, only 16 were ordered. IN terms of power, that represents a

phase of RSP<sup>17</sup> is to build on the achievements of PRSI by increasing the number of solar pump systems<sup>18</sup> so as to cater to as many Sahelian communities as possible.

28. In order to ensure that the positive effects of RSP I and II are long-lasting and the equipment continues to function and the supply of water and electricity (in the case of multi-purpose community equipment) is not curtailed, the technical capacities in the sub-region have to be bolstered.

29. This raises the questions of re-opening the Regional Centre for Solar Energy (CRES). Re-opening CRES appears to be a vital part of implementing the RSP since it will allow for the relevant systems to be made locally. Bearing in mind the size of the markets, local production will only make economic sense if it seeks to embrace the whole region and thereby realise economies of scale. If the CRES was to work in tandem with a local equipment manufacturer, this would pave the way for the definitive appropriation of the quality standards introduced by the RSP and would prevent the systems from deteriorating with use<sup>19</sup>.

30. The resumption of CRES activity in Bamako would not only help ensure that existing achievements are sustainable, but has also been cited as a key factor in the sound execution of future UEMOA programmes<sup>20</sup>, especially regarding the Commission's plans to promote renewable energies.

We will now see if the experiences of developing domestic energies produced as many encouraging results with regard to the renewability of biomass and improving access to water in the Sahel.

### **II.3. Experiments aimed at increasing sustainable use of biomass energy**

31. At the start of the 1980s, the countries of the Sahel listed the rational use of fuel wood and biomass in general (mainly for cooking) as one of the foremost challenges facing the energy sector. This was when these countries began seriously fretting about the excessive exploitation of forestry resources in a number of areas: in addition to arid areas, it was noticed that semi-arid ones were also stricken. It was evident that the baleful ecological effects of this would eventually generate damaging shortages of fuel wood and charcoal, and this at a time when more and more people relied on ligneous fuels to survive. What's more, the traditional equipment generally used for cooking (and which is still most commonly used today) was so archaic that had very low yields and in no way brought people closer to rationally using a resource that – it was now understood – had to be managed with care. Until such time as Sahelian economies take off and it is possible to fully effect (and speed up) the energy transition, it is essential to protect the renewability of ligneous fuels, since these alone cater for the needs of the poorest. The energy transition could consist of gradually diversifying domestic energies and partially replacing biomass by other energy sources

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total installed power of 1,386 Kwc, or 3.5% of the global photovoltaic market which is estimated to be worth about 40 Mwc. For further information, see. CILSS: Summary data of the Regional Solar Programmes, April 2003.

17 Encouraged by the success of the PWSI, the CILSS sought and obtained European Union funding for a second phase (PWSII) spanning 6 years and beginning in 2001. The total financial commitment was increased from 34 to 48 billion CFA Francs (from 52 to 73 million euro).

18 465 new drinking water pump systems are scheduled to be used to build players' capacities (community organisational management capacities and private sector operators' organisational and technical capacities) so that they may get more involved and better accompany the development dynamic and even the 'generalisation' of solar energy in the Sahel.

19 That would compromise the longevity of the systems and reduce their viability in the long run.

20 Cf. Terms of reference for the re-launch study of the Regional Solar Energy Centre, UEMOA, Ouagadougou, July 2003.

(renewable or otherwise) and, ultimately, by diversifying domestic fuels (complementarity of hydrocarbons and renewable energies).

32. As part of efforts to inculcate rational use of biomass energy, the following measures were instigated<sup>21</sup>:

- increasing the productivity of existing fuel wood resources;
- creating new forestry resources by planting trees and/or reforestation;
- organising the distribution of fuel wood;
- perfecting an adopting improved stoves;
- experimenting with substitution possibilities, etc.

33. The projects and programmes dedicated to traditional energies concentrated for the most part on domestic energies or, more precisely, on domestic fuels. There have been three main types of initiatives in this regard: those seeking to affect supply, those seeking to affect demand, and those seeking to introduce substitute energies<sup>22</sup>.

Three types of interventions sought to affect demand, and each met with different results<sup>23</sup> :

- large plantations aimed at securing ligneous fuel production. This type was the least successful. It seems that in the Sahel this approach is only worthwhile if ligneous fuels are a sub-product of timber production and if it is possible to sell in remote regions.
- agroforestry: this is not part of the customs or traditions of people in the Sahel, and it could only achieve wide-ranging effects if problems of land ownership and conditions of tree use are overcome.
- managing existing forests: when this is done with the participation of rural populations, it is the approach most likely to consolidate long-term fuel wood supply. Its optimal use depends in the long run on the opportunity cost of the land. In the short term, this suits subsistence farmers who, in addition to working their farm, can earn some cash income from the controlled exploitation of the neighbouring forests. In poor rural regions, this enables farmers to get a foothold in the monetary economy and affords them the financial resources that may help them concoct other income-generating activities.

34. Attempts to influence the supply side of things have focused heavily on improved stoves. Experiments on these began in Asia in the 1980s. This is a priority aspect of national energy and environmental preservation policies and has proved much more successful in urban areas than in rural ones. This is because in cities traditional fuels are a product that eat into the household budget – therefore, anything that helps economise its use frees up some money, and this is particularly welcome if it does not even necessitate altering cooking habits. In rural areas, however, fuel wood is gathered for free – households are therefore less conscious of the need to save, particularly as the yields from improved stoves are much lower than laboratory tests indicated and subsequent awareness-raising campaigns they would be.

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21 These conclusions are the same as those reached in the RPTES report. Cf. World Bank/Direction International Co-operation of the Netherlands: Examination of Policies, Strategies, and Programmes in the Traditional Energy Sector (RPTES), Conference of Donor Experts, report, Maastricht, 15-17 May 1995.

22 The decision to concentrate analysis on the impact of the projects and programmes should not obscure the fact that at country level these form part of national policies. Sahelian states have conducted forestry regeneration and conservation policies and National Action Plans for the Environment aimed both at meeting energy needs and gradually reducing use of wood fuel.

23 These conclusions are also the same as those reached in the RPTES report. Cf. World Bank/Direction International Co-operation of the Netherlands: Examination of Policies, Strategies, and Programmes in the Traditional Energy Sector (RPTES), Conference of Donor Experts, report, Maastricht, 15-17 May 1995.

As for the development of energies to be substituted for domestic fuels, the RPTES illustrates well the efforts so far undertaken in the Sahel.

In its initial phase, the RPTES<sup>24</sup> was an exercise for “examining policies, strategic, and programmes in the traditional energies sector<sup>25</sup>.” It was the first big programme on the renewable energies sub-sector. Sahelian countries governments committed to it in the 1990s with the aim of replacing ligneous fuels (wood and charcoal) with petroleum products (gas, LPG, and kerosene). To succeed, RPTES initiatives required considerable economic growth within the countries concerned so that householders’ income would climb, allowing them to purchase replacement fuels.

35. The RPTES attained mixed results because the government subsidies that were supposed to speed up substitution were of questionable value<sup>26</sup>. These subsidies tended to benefit high-income groups and commercial establishments (who were thus encouraged to increase their consumption at a cheaper rate)<sup>27</sup>. The principal effects of the initial phase of the RPTES can be summarised as follows:

- LPG penetrated more in coastal countries than in landlocked ones. A distinction can also be drawn between cities and rural areas and between the Atlantic Sahel and the inland Sahel. Inland countries are afflicted by three factors that weigh heavily on development projects: massive national surface areas, very dispersed populations, and lower GDP (than those of coastal Sahelian countries). Also, in importation of LPG in landlocked countries is more expensive because transportation costs are higher, buying in small quantities is scarcely not cost-effective and goods have to pass through several middlemen (and the distribution network has to be efficient in spite of the dispersal of end consumers). Senegal, and to a lesser extent, The Gambia are currently seeing use of LPG rise, especially in urban areas. In the end, however, the experiment of the regional programme to promote LPG was abandoned because it was decided that the means required to expedite the substitution process were prohibitive.
- Niger was the only country in the group that directly promoted kerosene, which was already quite commonly used in households for lighting. This promotion had some effect, since some households now also use it for cooking purposes.
- savings on ligneous fuels were markedly lower than forecast – because rather than switch directly from using one fuel to another, consumers tended to opt for using several different fuels.

36. The Regional Programme for the Promotion of Alternative Domestic Energies in the Sahel (PREDAS) deals with all domestic energies. It is the other major sub-regional programme on traditional energies. It has been in the pipeline since 1996, when it was drafted

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24 The Review of Politics on Traditional Energy Sector (RPTES) was originally called the Regional Programme for the Traditional Energy Sector. It was a programme launched by African Regional Office of the World Bank in the early 1990s and has just concluded in some countries, including five in the Sahel. The implementation of the programme gave rise to national projects: the Domestic Energy Management Project (PROGED) in Senegal, and the SED in Niger and Mali, etc.

25 The first phase (1993 to 1995) embraced some Sahelian countries, namely Burkina Faso, Mali, Niger, The Gambia and Senegal.

26 Cf. the discussions on these points in Cf. World Bank/Direction International Co-operation of the Netherlands: Examination of Policies, Strategies, and Programmes in the Traditional Energy Sector (RPTES), Conference of Donor Experts, report, Maastricht, 15-17 May 1995.

27 Senegal established a transversal subsidy programme for consumer demand. But the economic costs were judged too high for other countries whose GDP is lower than Senegal’s. Even the Senegalese did not persist with the policy for very long, since it decided to liberalise the economy and its expenditure was scrutinised ever more closely by the guardians of its Structural Adjustment Programme..

and implemented as the Domestic Energy Programme (DEP Sahel GTZ/CILSS). It is presently being continued with funding from the European Development Fund (EDF)<sup>28</sup>.

37. While the RSP concentrates exclusively on developing photovoltaic solar energy, the PREDAS also strives to make increased use of thermal solar power. Accordingly, it has promoted numerous applications such as prototypes of driers, water-heaters and stills. It has not yet been applied much to food cooking, efforts in this regard being restricted to a handful community eating facilities.

38. The objective of PREDAS is to enable all categories of public and private players (member states of CILSS, NGOs, private sector operators, etc.) to organise in a professional and concerted way the sustainable supply of and rational use of domestic energies in a way that contributes to the fight against poverty and protects the environment<sup>29</sup>.

39. The overall observation that can be made today is that the plethora of short and geographically and financially low-scale initiatives have faded away and are being replaced by programmes that operate at sub-regional level and aim to stimulate dynamics for integrating national strategies. This move from projects to programmes is borne of the accumulated experiences of the 1970s and 80s. These experiences also demonstrated the importance of studying and taking account of socio-economic factors affecting demand and the way that groups of consumers organise energy services and how these should be operated<sup>30</sup> (renewable energies).

### **III. Lessons:**

#### **Introduction – A recap and capitalisation exercise**

40. The recap and capitalisation exercise relates to both the renewable energies most frequently used in the experiments covered above and the strengths and weaknesses of the projects and programmes that promoted them.

#### **III.1. Strengths and weaknesses of the projects and programmes conducted in the Sahel**<sup>31</sup>.

41. The strengths and weaknesses of the projects and programmes conducted in the Sahel correspond directly with the socio-economic and/or environmental objectives aimed for. This is true both for all renewable energy sectors worked on and all technologies developed (photovoltaic solar, thermal solar, and wind power).

42. There are three good reasons for combining the promotion of renewable energies with the strategies of energy diversification and substitution currently adopted<sup>32</sup> by the countries and which may soon be implemented at sub-regional level (UEMOA):

<sup>28</sup> The new funding convention for launch activities in member countries is 3.5 billion CFA Francs 3,5 milliards de F CFA (PREDAS II).

<sup>29</sup> For further information, cf. CILSS/AGHRYMET/USAID/PREDAS/KoZon Foundation: The role of new and renewable energies in the conservation of natural resources and food security in the Sahel, Niamey, 4-9 March 2002.

<sup>30</sup> The RPTES concluded that efforts at improving the efficiency of traditional energies only met with mixed results. This was partially due to the approaches taken, all of which laid the emphasis on technology without paying enough heed to socio-economic factors. Later on, when greater attention was given to these factors, results were better.

<sup>31</sup> This recap condenses the conclusions in an unpublished article by Youba SOKONA on renewable energies and desertification, as well as the findings of various CILSS reports on RSP, PREDAS, and the Donor Experts report RPTES (1995).

<sup>32</sup> These relate to domestic fuels and, to a lesser extent, grid electricity produced from hydrocarbons.

- renewable energy technologies are practical and appropriate for the decentralised use most applicable to the Sahel;
- potential for harnessing them is high;
- using them results in less environmental problems than the use of fossil fuels does.

43. There are, however, some hindrances attached to the use of renewable energies. This is due to the fact that they are disparate and hard to stock and transport. Moreover, the production sites where they are available are in many cases far from the areas with significant human settlement, which is where they are needed<sup>33</sup>

44. *The main weaknesses* in the various initiatives throw up different lessons for modern and traditional renewable energies.

45. For modern renewable energies, one of the main things the evaluation decried was the lack of technological mastery and the absence of any local industrial capacity for manufacturing at least some of the components of the equipment required for thermal solar, photovoltaic or wind power. For example, all of the equipment provided by the RSP was built outside the Sahel and then imported.

46. As for traditional renewable energies, especially domestic fuels, the principal lesson to be drawn from the RPTES<sup>34</sup> is that the improved stoves, which were promoted in numerous experiments, did not exert any tangible impact on biomass consumption patterns. The quantities of fuel wood and charcoal being consumed at the end of the experiments had not dwindled in any absolute way since the start. Improved stoves did, however, prove to have an important social role and, as such, their promotion should be pursued not for the goals of the programmes described here but to achieve other aims, notably protecting the health of women and children. In terms of the resources spent, the paltry net energy saving from improved stoves justifies the following explicit RPTES recommendation: “their promotion should not be a top priority in the energy sector.”

### **III.2. The Sahel’s assets and hindrances**

47. This refers to both structural and circumstantial assets or hindrances currently pertaining to the Sahel. Any intervention strategy must provide for them.

48. The weakness of the public sector. The role of the public sector mainly relates to efforts to improve management of traditional energies: providing adequate financial resources, re-organising institutions, drafting relevant legislation and regulations, ensuring these laws and regulations are respected, adopting appropriate fiscal measures, lead participatory processes with the populations who, in many cases, have customs-based rights to use natural resources in rural areas, etc.

49. All of the funding for projects relating to renewable energies came from abroad. It is regrettable to note that in cases where this funding dried up, activities have either slowed down or stopped entirely, meaning any achievements that were made are neither perpetuated nor consolidated.

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<sup>33</sup> Their use is intended particularly for rural areas while the Sahel is urbanising rapidly and there is a tendency to overlook greater-urban areas which is where poor populations are concentrated and where there is little short-term possibility of being connected to a power grid.

<sup>34</sup> Cf. Cf. World Bank/Direction International Co-operation of the Netherlands: Examination of Policies, Strategies, and Programmes in the Traditional Energy Sector (RPTES), Conference of Donor Experts, report, Maastricht, 15-17 May 1995.

50. Fiscal policies and price controls do not have clear objectives and are not well harmonised. This is due to the lack of co-ordination between the activities of a variety of bodies in the domestic sector and explains why attempts by public authorities to regulate the sector have borne little fruit.

### III.3. Major lessons

51. To effectively tackle desertification, while taking account of the importance of demand in the energy system, it is essential to develop approach it from the point of view of widening access to water and ensuring the sustainability of biomass.

52. From a strictly physical outlook, concentrating more on wood substitution options (water-heaters and solar cookers, bio-gas, etc.) and methods of securing rational energy use (improved stoves) is paramount. The experiments conducted so far in the Sahel demonstrate that in spite of their strong potential (and it is because of this potential that greater interest is being shown in them) renewable energies cannot be substituted entirely for traditional energies in the short or medium term.

53. So far, photovoltaic and wind pumping have garnered the most encouraging results in terms of thwarting desertification by broadening access to water.

54. It must be remembered, however, that each renewable energy technology does not help resist drought in the same manner.

55. Photovoltaic solar and wind power, for instance, go a long way to widening access to water and electricity in isolated arid areas. Meanwhile, biogas, solar cookers and improved stoves makes for good substitutes to wood when it comes to cooking and saving ligneous fuels and getting a grip on energy use.

56. Most rural Africans live in poverty and are prey to a series of baleful effects that are both causes and consequences of poverty – providing them with access to energy will not conquer these problems in itself.

57. To overcome these challenges, it is vital to effectively combine the development of renewable energies, the promotion of income-generating activities and the fight against desertification and poverty. The mixed, and in some cases disappointing, results in some localities where renewable energies were implemented casts doubt<sup>35</sup> on any notion that simply providing these energies will trigger development<sup>36</sup>.

58. None of the projects or programmes described put sufficient emphasis on stimulating income-generating activities despite the fact that this is one sure way of guaranteeing the perpetuation of the project's achievements. For example, the RSP tried to promote the irrigation of small market-gardening plots but this failed because it was conducted by farmers operating individually or within small private groups rather than guided and backed by public authorities. And yet, the RSP was a public investment programme that was implemented by the various Hydraulics Departments who were attempting to cater to collective needs. The experience of Senegal proved when civil servants from these Departments actually invest in developing irrigation for market gardening and find ways of taking account of the producers' specific needs and modus operandi, photovoltaic solar energy can be put to highly beneficial

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35 cf. Article by Bernard Devin: Faut-il privilégier les énergies renouvelables dans la coopération Nord-Sud ? , in Global Chance, n° 15, February 2002, pp.50-57.

36 The only part of the RSP programme that aimed to harness solar power for production or market gardening wound up being dropped.

use. When it does not need to pump very deeply and only for relatively small plots, it can even enable the viable cultivation<sup>37</sup> of crops with high added values.

59. The contribution of domestic energies promotion to the improvement of biomass management is somewhat ambivalent, and even in cases where it rendered positive results these were not sufficiently impressive to justify the disproportionately large financial investments.

60. It would be more worthwhile to integrate wood management programmes into holistic rural development programmes. This, of course, demands that rural development programmes features several mutually-enhancing dimensions. Taking this approach, photovoltaic solar energy could be harnessed to power water pumps, health centres, schools, etc.

61. Basically, to succeed, the substitution strategy depends on householders' income increasing. The problems is that because if their current economic straits, the countries cannot afford to offer the subsidies for equipment that would accelerate this process.

62. The lack of inadequateness of attempts to co-ordinate decisions relating to the formulation and implementation of national energy strategies. The various initiatives that have been enacted here and there are not done so as part of a sustained, holistic approach to harmonising national and sub-regional projects and programmes (into, for example, "projects for adapting to the adverse effects of desertification"). These should all be linked with the Poverty Reduction Strategy Papers that now guide Sahelian national policies as much as they do those of other developing nations. Having a proliferation of dispersed initiatives and decision-making centres militates against coherent developing national policies based on renewable energies;

63. Facilities still cost a lot under current financing conditions, and this explains why photovoltaic solar power has so far only spread around the Sahel in a very « artificial » way despite the promising results its has recorded where used.: the required equipment has not cropped up in many places because the investments at the outset came from international development partners<sup>38</sup>. If achievements are to last beyond the life of projects and programmes and if the benefits of harnessing renewable energy in terms of fighting poverty and desertification are to spread further afield, coherent strategies must be devised as a prelude to the adoption and application of real national and sub-regional energy policies.

#### **IV. Strategies: from Tunis to Bonn**

64. What use was made of the springboard provided by the 1998 Tunis workshop held by the Secretariat of the Combat against Desertification on promoting renewable energies in Africa? What strategic approaches could the countries of the Sahel, as well as other Developing

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37 Questions must be asked about the "viability" of projects when all funding comes from abroad ... these is merely theoretical viability; it does not prove that Sahelians are capable of undertaking such investments by themselves?

38 One of the characteristics of photovoltaic energy is that it requires higher amounts of investments than other systems that provide the same amount of water through electricity generator and an electric pump. Offsetting this however, is the fact that photovoltaic needs less maintenance costs for users, the governments, local authorities, overseas public aid bodies.

Countries confronted with desertification, devise together to present their problems, successful experiments and their needs for financial and institutional support at Bonn?

65. The number of separate initiatives that would have a greater impact if they were combined and integrated is quite striking. The projects and programmes designed to promote renewable energies should be treated as part of the implementation of PRSP's.

#### **IV.1. What strategy can be deployed to integrate the promotion of renewable energies into the implementation of the provisions of the United Nations Convention to Combat Desertification?**

66. We will respond to this by taking account of the Sahel's achievements so far in promoting renewable energies and fighting desertification. We will seek to identify the sub-regional institutions that operate at both these levels.

##### *The CILSS*

67. In 2002, the major political programme that is the CILSS set in motion activities relating to the Convention to Combat Desertification. These activities focused on:

- a) supporting the formulation of National Actions Programmes to fight desertification,
- b) devising Sub-Regional Actions Plans to fight desertification in West Africa (SRAP-WA),
- c) helping produce national or sub-regional progress reports on the implementation of the fight against desertification,
- d) supporting the preparation of projects for fighting desertification as part of the New Partnership for Africa's Development (NEPAD).

68. As part of the implementation of the decision of West African Environment Ministers to use the SRAP as the centre-point of NEPAD environmental policies, the CILSS, in collaboration with the Economic Community of West African States (ECOWAS) identified ten main projects, covering a range of fields including promoting renewable energies and the controlled supply of water for human and animal needs, etc.

69. The CILSS has also run several programmes that touch on renewable energies and the fight against desertification, including:

- the Regional Gas Programme (RGP), which promotes substituting fuel wood with butane gas – this was completed in 1994;
- the Surveillance Programme for Natural Resources in the Sahel (PSRN) – completed in 1993,
- the Regional Solar Programme,
- the PREDAS.

70. A study conducted by the UEMOA Commission on the community strategy for promoting renewable energies was validated in march 2001 and recommended making CRES operational again and using it to build capacities and train human resources in the UEMOA zone. It would also serve to provide the sub-region with a research and development centre capable of carrying innovation and technological experiments and also up-scaling to the dissemination phase.

71. What use would the CRES be to the countries of the Sahel? For a start, it would equip them with a sub-regional framework for discussing shared problems, which they so hitherto tend to try to tackle on their own. This solo strategy has not yet yielded remedial results; hence Mali, Niger, Senegal and Burkina Faso are all bearing the costs of research centres that

are working to develop similar renewable energies with very limited means and very limited possibilities of impacting on their (human, physical and institutional) environment. We do not mean to question the existence of these bodies, but rather stress the fact that re-launching the CRES would allow for joint strategies to be planned and adopted more easily, and for common research targets to be identified, means to be pooled with much of them coming from members states so that the Centre is not dependent on external funds that will shortly be reduced to trickle.

#### **IV.2. What strategy can be applied to integrate energy policies into PRSPs?**

72. Access to water (notably to be able to cater to other basic needs such as health, education and the eradication of poverty) is one of the declared priorities for the Sahel in the Millennium Development Goals.

73. The NEPAD also emphasis how crucial it is to have water available. Indeed, the NEPAD lists ten priority sectoral areas without which development is impossible, and these include among others the following: infrastructure, education, health, agriculture, energy, the environment.

74. These two facts indicate that integrating the Convention to Combat Desertification's priorities with governments' other development strategies is a valuable step to take.

75. From this point of view, attention should be drawn to the Coopener initiative launched by the European Union to help developing countries access energy as part of the fight against poverty. What makes this initiative special is that it first considers the energy needs of each player in a country (demand), including the government, local authorities, private sector operators, informal sector operators, farmers, transporters, national electricity companies (privatised), rural electrification agencies, funders who support energy, etc. The idea is the approach from the most decentralised point to identify needs while taking account of the priority development actions in the PRSPs that have already been devised and which are regularly revised. Examining diversified energy strategies in this way could inform strategies for promoting renewable energies so that they mesh well with, for example, the conventional electrification strategies. Implementing Coopener thus enables us to move from a project-based approach to a participatory energy approach based on policies rooted on real and well-defined needs. It is still, of course, necessary to identify the level of financing required to accommodate these needs and, if necessary, development partners willing to get involved.<sup>39</sup>.

76. The very act of rallying several countries to request funding together for formulating energy policies is already a step towards outlining an Sahelian energy strategy. It is sub-regional because it recognises the need for different countries to work together to find funding for mutually-beneficial major infrastructure, and it is national, local and even regional insofar as it provides for the expression of sub-strategies to meet specific needs.

77. As politics in African begins to democratise, decentralisation is gaining more momentum and local authorities are becoming major players with meaningful authority and responsibilities. In addition, economic liberalisation and the greater involvement of the private sector have begotten many micro-enterprises in the informal sector. This in turn

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39 As Youba Sokona and Jean-Philippe Thomas stressed in their article on renewable energies (no. 15 Cahiers de Global Chance) : "By prioritising the project approach, public powers sacrificed the cohesion that should underpin energy policy. It can never be said enough: a cluster of projects does not equal a policy, particularly if each project is moulded by donors. How can we get decision-makers to understand that diversified local solutions do exist and they reflect local development resources and needs?"

requires the development of micro-financing as development paradigms in the Sahel are reconfigured. In a zone such as the Sahel where poverty is widespread, no measure aimed protecting the environment and instilling sustainable development will be welcomed unless it also strives to improve living conditions and boost peoples' production potential.

## **V. Conclusion – Sifting through questions and suggestions to devise a strategy for the Bonn Conference**

78. The Bonn Conference on Renewable Energies is scheduled to run from 1 to 4 June 2004 and aimed to promote renewable energies around the world. It constitutes one of the reactions to the call<sup>40</sup> emitted at the Johannesburg Summit to work for the global development of renewable energies. That summit saw the European Union pledge one billion euro and the United States commit to providing five billion dollars. It is, however, far from certain that these sums will be channelled directly into renewable energies.

79. The main outcomes expected from the Bonn Conference are:

- a declaration describing the vision and common political objectives for promoting renewable energies and creating a more efficient and more sustainable world energy system that takes account of differing regional realities. A guide to best practices that will aim to generate greater cohesion in the way efficient political strategies are implemented will accompany this declaration,
- an international action plan put forward by governments and other participating players (private sector, civil society, etc.), featuring concrete strategies and commitments to implement the policy declaration to develop renewable energies.

80. The attendance make-up at Bonn will be such that the Conference could offers a prime opportunity to countries from arid, semi-arid or dry sub-humid areas to highlight their difficulties and the stakes relating to renewable energies in their specific context.

81. As part of the Johannesburg Renewable Energies Coalition (JREC), the European Union is going to make a presentation on the results attained with regard to developing renewable energies, and will also assert its targets for 2010 and 2020 and propose strategies for reaching them. The developing countries are invited in partnership with their development partners to incorporate renewable energies more effectively into their bilateral or multilateral co-operation endeavours.

82. Developing countries exposed to the effects of desertification could prepare to discuss and debate the following issues with their development partners and other regions of the world:

- proposals of innovative new financial initiatives, featuring, for example, new co-financing schemes,
- the identification of conditions and modalities for stimulating or developing a genuine renewable energies market. Countries threatened or afflicted by drought and desertification could eventually take part as providers of simple and competitive technologies. This aspect includes the definition of a strategy for getting the private sector involved in developing renewable energies. It also entails encouraging countries to enter international co-operation agreements on research and development on renewable energies,

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<sup>40</sup> This call refers to the text of the Coalition of countries willing to promote renewable energies, or the Johannesburg Energy Coalition (JREC)

- bolstering and expanding existing networks on renewable energies that harnesses the input of political analysts, advisors, researchers, practitioners, decision-makers, etc.

83. The bottom-up approach is the best for capturing the proposals of all various groups of players and groups of countries (developed or developing). Feeding this approach involves making available information, analyses, questions and debates on pre-determined subjects, in much the same as the present document does. Countries affected by drought and desertification could then lobby their traditional or potential development partners on the basis of their objectives, priorities or development strategies. These partners could then support the countries by implementing the actions recommended by the G8 Task Force on renewable energies and the Bonn Monitoring Process.

84. In conclusion, we will suggest below some elements for fuelling question and discussions with a view to arriving at strategies that all developing countries affected by desertification may pursue in Bonn.

85. Countries afflicted by drought and aridification need to radically re-think their energy policies in order to develop renewable energy sources and better cater to their fundamental energy needs, especially in terms of the fight against desertification. Their revamped policies could include the following features, which are suggested on the basis of the lessons learned from the Sahelian experiences described in this document<sup>41</sup>:

- a- the systematic study of possibilities for using renewable energies in national infrastructure programmes (village hydraulics, health, irrigation, etc.). In some countries (such as Senegal and Mali), there are major rural infrastructure programmes funded by the World Bank, but there is a lot more scope for harnessing renewable energies in the drafting and implementation of national energy policies. The same goes for (sub) regional programmes. In the Sahel, any such infrastructure programmes would involve UEMOA or the NEPAD;
- b- the re-definition of standards used for analysing the demand, production and distribution of energy. This aspect relates most readily to rural electrification (which has a lot to do with broadening access to water) and the commitments of national electricity producers and distributors to using renewable energies;
- c- much more proactive fiscal and taxation measures on products and services related to renewable energies with a view to offering incentives for initiative;
- d- public financing of start-up infrastructure and/or equipment for various initiatives. For example, the penetration of photovoltaic systems will depend on a great deal on public authorities' funding of it. Market forces alone will not be enough to propagate use of such systems because peoples' purchasing power is so low. Carefully targeted actions by governments, however, can create the conditions for extensive dissemination steered by the state but implemented by private operators. Developing solar equipment in the coming years will require this kind of public input (and the enactment of a favourable institutional and legislative framework);
- e- greater consultation and harmonisation on the implementation of regional programmes and at all levels and in all fields (research, pilot actions, dissemination);
- f- devising financial schemes that enable local authorities, associations and individuals to get medium term loans to acquire basic equipment;
- g- boosting local knowledge and expertise on renewable energy technologies as they develop. This means:

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41 These proposals broadly reflect those made by Youba Sokona in article on renewable energies and the fight against desertification.

- in terms of theory, knowledge should be capitalised in national and regional research centres. This will lay the foundation for indigenous research and development;
- from a technical perspective, private initiatives relating to the manufacture, installation and maintenance of relevant equipment should be encouraged and supported. Private operators should also be given incentives to develop products specifically suited to local demand – these products will be less vulnerable to competition from imported ones;
- the market for photovoltaic system exists at sub-regional level; but one of the primary tasks of efforts to promote renewable energies is to de-compartmentalise national markets because they are too small and shifting beyond them is an effective vehicle or regional integration. The absence of a critical mass of specific local skills in the photovoltaic sector constitutes a danger to the environment. Analysis of the Sahelian initiatives found that projects and programmes (such as the RSP) helped stimulate the emergence of private companies providing solar equipment. This had a knock-on effect that saw a flourishing in the number of local operators in the photovoltaic market.

86. Alongside strategies designed and implemented at national and sub-regional level, it would be worthwhile to forge stronger and better focused bonds with development partners from the North. We should also endeavour to inject as much genuine content as possible into South-South co-operation, especially between the least developed African countries and South Africa and, at a wider level, between Africa and Asia, where there are numerous countries affected by drought and desertification.

87. In terms of the first form of co-operation (South-North), African countries affected by drought and desertification should seek support for the development of *a more effective policy of North-South and South-South transfer of renewable energy technologies* as opposed to allowing developing countries (especially in the Sahel) remain mere zones of experimentation for Northern research laboratories.

88. In the second form of co-operation (South-South), we need to reflect on the mutual advantages that we can offer each other. It is high time to augment exchanges of experience between sub-regions. Interesting experiments have been carried out in English-speaking countries in East Africa (notably Kenya), while the success of the Diambar furnace in Senegal, which came from there, should serve as a catalyst to more such initiatives.

89 African shares a lot of difficulties with Asia, most notably the heavy demographic pressure. The fact that many Asian countries are emerging industrial powers means they can produce technologies that are not too sophisticated at very competitive prices. They can have greater capacity to train local craftspeople (in how to make certain pieces of equipment used for harnessing renewable energies). African countries must, therefore, launch a concerted research and development exercise to identify their own priorities and then, on the basis of these, find Asian partners that will produce what local plants (working in tandem with the CRES in the case of the Sahel) cannot produce in the short term.

90. Africa can learn a lot from Asia, particularly, for example, from the way agriculture has been modernised in some parts of Asia through irrigation and intensive use of inputs. This type of agriculture allows soil to regenerate and develops energy production through

methanisation. If Sahelian countries could tie up partnership agreements with agricultural institutes in the East, they may be able to further develop certain energy crops (plant oil) or medicinal crops. This would create additional income and thereby earn more than selling wood. By offering extra income, substitution strategies are much more likely to take root, since LPG would become affordable and the energy transition would take off.

91. The Bonn Conference offers an excellent context for all interested partners to agree on the best possible conditions for providing support to the efforts to promote renewable energies in countries affected by desertification. The resolve shown by the Sahel countries in developing biomass regeneration programmes necessitates major funding and relevant expertise.

92. The Bonn Conference provides an opportunity to discuss policies and measures to be implemented with a view to supporting the efforts being taken by several countries affected by desertification. The first step towards sustainable development is the ability to survive. The second is development. Both these concerns should be considered when defining and implementing concrete responses to the needs not only of the Sahel but also of more than an hundred and ten other countries, which are working towards promoting renewable energies with the aim of combating desertification and attenuating the effects of drought.

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