

**SECOND NATIONAL STATUS REPORT ON
LAND DEGRADATION
IMPLEMENTATION OF THE UN CONVENTION TO
COMBAT DESERTIFICATION IN SRI LANKA**

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Abbreviations

ADA	Agriculture Development Authority
CLEO	Crown Lands Encroachment Ordinance
CEA	Central Environmental Authority
CEIF	Community Environmental Initiative Facility
CEPOM	Committee on Environmental Policy and Management
CIEDP	Committee on Integrating Environment and Development
CBO	Community Based Organizations
CRI	Coconut Research Institute
CZMP	Coastal Zone Management Project
DOA	Department of Agriculture
DWLC	Department of Wildlife Conservation
EIA	Environmental Impact Assessment
FD	Forest Department
FSMP	Forestry Sector Master Plan
FRMP	Forest Resources Management Project
GEF	Global Environmental Facility
GIS	Geographical Information Systems
HARTI	Agrarian Research and Training Institute
IDA	International Development Agency
LDO	Land Development Ordinance
NEAP	National Environmental Action Plan
NRMC	Natural Resources Management Centre
NGO	Non Governmental Organization
NWRA	National Water Resources Authority
PLMC	Pilot Land Management Component
RRI	Rubber Research Institute
SAMS	Special Area Management Plan
TA	Technical Assistance
NSF	National Science Foundation
NBRO	National Building and Research Organization
UWMP	Upper Watershed Management Project
UNDP	United National Development Programme
UNCCD	United Nations Convention to Combat Land Degradation

INTRODUCTION

Sri Lanka falls within the scope of the Convention to Combat Desertification (UNCCD), though the country is not within the range of desert area specified by the UNCCD. At present no real desert areas exists in the country, although there may be a possibility that especially, the dry and arid zone areas in the country currently faced with severe land degradation may gradually face desertification if, no cohesive and planned action is taken to resolve the related issues.

Land is considered as the most important and heavily threatened natural resource in the country. Sri Lanka is a predominantly agricultural nation, where land ownership is considered as a social and economic status. The sustenance of agriculture sector on which the economy of the country is heavily dependent, is directly linked to the systematic management of the land under cultivation. At present about 37 percent of the people in the country are dependent on land centred activities for their sustenance.

In the dry and arid zones of the country the widespread land degradation issues are mainly related to, water logging and salinization caused by human interventions, such as deforestation, unsustainable agricultural practices, poor water management and the intense drought conditions. However, land degradation in the country is not confined to the dry zone areas alone. The wet zone in the country is also subject to severe land degradation, mainly due to soil erosion. In addition, the coastal areas are also subject to sea erosion caused mainly due to human interventions.

The wide spread land degradation in the country is the result of improper land management and misuse of land. Soil erosion is regarded as the main form of land degradation in the country. Soil erosion besides causing loss of productivity, sets off a host of off-site adverse environmental impacts, damage to downstream agriculture land, pollution of coastal waters, aggravated flood effects, etc.- which causes serious losses to the economy. The clearing of land for plantation agriculture, the cultivation of tobacco and vegetables on sloping lands, nationalization of plantations and the subsequent neglect in management, the setting up large scale irrigation and hydropower schemes and settlements have all contributed to soil erosion in the country.

Although the direct causes to land degradation are well known, the underlying causes that give rise to direct action cannot be overlooked. These include socio-economic factors such as inappropriate tenurial patterns, poverty, landlessness, lack of alternatives for livelihood, and mostly population pressure. An analysis of the issues reveals that land degradation has its roots most deeply embedded in the problem of tenure insecurity. Hence, tenure insecurity has often and again been cited a vital issue to be addressed in any major scale initiative to combat land degradation. Over the years the solutions to land degradation have mostly contained as policy and institutional responses, which focus on the symptoms rather than the causes.

Over the years many initiatives and measures have been taken to reverse the trends in land degradation, including enactment of laws and regulations, formulation of policies and through the establishment of institutions mechanisms. However, there is much more to be done in resolving the issue and in sustainable land resources management. It is in this regard that land resources is considered as the most important natural resource in the country and combating land degradation is a priority in the national agenda.

In this context, the Convention to Combat Desertification is of much importance to the country, as it would provides a basis for facilitating efforts towards addressing land degradation issues in the country. This can also be used an opportunity to share experiences and knowledge on the subject with other countries and learn from one another. This would enable Sri Lanka to obtain the necessary skills and capacity so that the country could positively contribute towards the national efforts in dealing with land degradation and most importantly avoid such calamity in the long- term.

This Status Report highlights the developments and initiatives taken with regard to addressing land degradation issues in the country. The report covers the period between the first status report and present. The analysis of the present situation provides an insight on the status with regard to the main issues, causes and effects relating to land degradation in the country. The recommendations provided in this report are expected to provide some insights in the development of the Action Plan to Combat Land Degradation in Sri Lanka.

The draft report was circulated at a national workshop attended by stakeholders and experts in the related sectors and also at the National Expert Committee on Land Degradation and discussed in detail. The report presented here has included all comments and suggestions made at these forums.

1. LAND DEGRADATION: ANALYSIS OF PRESENT STATUS

1.1 Background

The total land area of Sri Lanka is 65,610 sq.km and the present population is over 19 million, which is estimated to increase to about 23 million by 2031. Over 72 per cent of the total population in the country live in rural areas. Increasing pressure of population on land has led to a rapid decline in the land: man ratio from 2.5 ha/person in 1880 to 0.38 ha/person in 2000, and widespread landlessness has forced people to encroach upon state land. Pressures on land have mainly led to various forms of land degradation; such as deforestation and forest degradation, soil erosion, salinization, etc. An indication of the land use and ownership patterns in the country is given in Annex 1.

Estimates show that 44 per cent of agricultural land in the country is under some form of land degradation. Studies have revealed that the contribution from land-based activities to the national economy has declined to 18 percent in 1998 compared to 26 per cent in 1978. Many of the land use practices, past and present have reduced the productive capacity of soil and land as a whole in the country. It is estimated that about 30 per cent of the land in the dry zone is degraded and unsustainable for agriculture, while 30 percent of tea lands in the wet zone are considered to be marginal and uneconomical for cultivation. In 1998 Griggs reported that some 10 per cent of tea land and 25 per cent rubber land had been abandoned due to reduced productivity from soil erosion. The total cost of environmental damage during 1992 as a result of soil loss (hill country) and chena cultivation is estimated to be Rs 3427 million and Rs 1500 million respectively.

Over the years many measures have been taken to contain soil erosion in the country, which reflect the concern of the Government in resolving the issue. These are reflected in the policy initiatives taken, legislation, and the formulation of plans and strategies, the institutional mechanisms and in the field level interventions, which are explained in detail in the sections of the report. This section will highlight the present status in respect of the critical issues related to land degradation in the country, its effects and the measures taken to address the issues.

1.1.1 Soil Erosion and Measures

Soil erosion was first evident in the 19th century with the expansion of human settlements and cultivation of upland rain fed cultivation crops, which was further aggravated with the removal of natural vegetation and the introduction of plantation crops in the upper catchments in the country. This issue was first raised as far back as 1837 and was also highlighted in the Sri Lanka Report of the Committee on Soil Erosion 1931¹. Due to the inherent characteristics of the soils and the erosivity of the rainfall in this region, the dry zone is more vulnerable to soil erosion than other parts of the country. However, comparative studies have shown that the mid country has the highest soil erosion rates, which can be attributed to the high intensity of rainfall, long and steep slopes and poor land and crop management practiced in these areas. Therefore, erosion is a problem in all zones of Sri Lanka, but its magnitude differs from area to area. Annex 2 provides detailed information on soil erosion in the country by district, region and by type of crops.

It is estimated that on the average 5-10 mm of topsoil is lost per year. Soil erosion in tea land is considered to be more severe than with other plantation crops such as rubber and coconut, because of the steep topography and the method of soil and crop management practiced. The repeated cultivation of soil erosive crops such as tobacco, vegetables, potato etc have aggravated the problem further.

While levels of soil erosion are significant and cause for concern, the important fact is how erosion varies between well and poorly managed agricultural crops. Soil losses on tea plantations well managed are 330 kg per ha over a period of four years, while poorly managed tea lands yield losses up to 20 tons per ha per year. In seedling tea with no conservation measures up to 40 tons of soil is lost per ha per year.

Soil erosion is a costly issue, as its associated cost to the Sri Lankan economy is estimated to be Rs 4900 million per during 1998². These costs include onsite loss of productivity and the offsite impacts of sedimentation on water storage and hydroelectric power production. The same study identified pricing mechanisms for land and property rights as two main critical issues causing land degradation. In the dry zone, the problem of siltation has reached serious dimensions as the water holding capacity of village tanks; especially smaller ones have been reduced to about 60 per cent of their capacity. In addition, road building especially in the hill country cause soil erosion, with the recent road construction to Ambuluwawa range can be cited as a good example to this effect.

Sufficient data on soil erosion in the country is required for assessing its current status. Most of the studies on soil erosion have been done during 1993- 998 and the latest data available is for this period. However, monitoring of soil erosion at various locations are being carried out on a regular basis. The UWMP over the past two years has been involved in monitoring soil loss in one main and several sub-locations in one catchment area of the project. The data has not been analyzed to ascertain the current position, but mainly through observations and remarks made by the farmers in the area, it is believed that soil loss has decreased as a result of conservation measures (mechanical and vegetative) adopted over a period of 4 years. There are views that these interventions have also reduced sedimentation rates in the Rantambe reservoir. The Mahaweli Environment and Forest Conservation Division located at Polgolla is also involved in monitoring sediment transport in major tributaries and siltation of reservoirs.

The establishment and maintenance of buffer zones in critical watersheds in the country is another method of dealing with land degradation issues in the country. Rehabilitation of watersheds at present is being carried out with community participation under the ongoing projects.

The Land Use Policy Planning Division of the Ministry of Lands is carrying out an island wide land use-mapping programme, where detailed land use maps for several districts have been completed. As a part of the larger programme, mapping and surveying of land above 5000 ft in the country is also ongoing. The land uses on these areas will be identified and sensitive areas will be identified for conservation purposes. This exercise will also assist in information generation required for land use planning purposes.

The impacts of soil erosion may not be evident in the short-term and hence the situation must be assessed in the longer term. The positive note here is that, measures are being taken to prevent soil erosion in the country and especially in selected critical watersheds.

1.1.2 Occurrences of Landslides

Landslides are another significant aspect of land degradation and are largely prevalent in districts of Kegalle, Kandy, Nuwara Eliya and Ratnapura. It occurs generally where slopes are steep and are aided by other factors such as deforestation and other unsustainable land use such as clearings, slope cuts, enhanced infiltration and various human activities. Occurrences of landslides have been in the increase

during the last few decades with recurrences in some cases. 1988 landslides damage surpassed all earlier ones by their number and magnitude and caused much destruction to man and property. Again in 1988, a major landslide, which occurred, killed some 300 people. As per records maintained by the Social Services Department, it is evident that Sabaragamuwa Province was the worst hit and therefore needs priority attention in any mitigation measures.

Available evidence suggests that the frequency and magnitude of landslides is in the increase. Prior to 1980, there were only 34 landslides in the country while between 1980 and 1991 the number of known landslides increased to 171. The NBRO initiated a landslide mapping exercise in 1990, which provides vital information on location of landslide prone areas in Badulla and Nuwara Eliya districts, in order to regulate the development of housing and infrastructure on a sustainable manner. According to the data available with the NBRO, approximately 12,5000 ha of land in the hill country are vulnerable to landslides. The use of such information in mitigating landslide related disasters are now in the increase, with the preparation of a policy and action plan to handle disasters in the country. The main issue in the past have been available data on landslides are not being used by the authorities concerned in preventing such disasters.

1.1.3 Drought and Water Shortages

Scarcity of water is prevalent in many parts of the country, in spite of its favourable location and two seasonal monsoons per year. The non-occurrence of seasonal rains is the main causes for severe droughts. Global phenomena such as EL Nino also cast a negative impact on the first inter-monsoon in the country. Drought conditions occur mostly in north central, north western and southeastern parts of the country. Hambantota has the highest probability of drought occurrences in both seasons. The issue of drought is critical as it has very serious negative impact on the socio-economic status of the country. Government expenditure for relief as compensation for crop failures in 1991, 1996 and 1997 was Rs. 230, Rs. 297 and 297 million respectively. The number of families affected by drought during the period 1981 to 1997 has ranged from 3008 to 652,363 respectively. When analysing the amount of expenditure incurred by the Government towards drought relief it is clearly seen that there is a vast increase: 1981- Rs 42.65 million; 1982- Rs 118,92 million; 1991- Rs 230,20 million.

Sri Lanka has a good record of maintaining weather and related data over a long period of time. The Departments of Irrigation, Meteorology, and Agriculture are the main Government agencies responsible for collection of hydro-meteorological data needed for water resource management on a scientific basis. The Meteorology Department maintains the national meteorological network, which includes 22 principal Weather Stations covering the entire country. The Department of Agriculture maintains a network of Agro-Met Stations and a network of evapo-transpiration pans. The National Water Supply and Drainage Board has a ground water branch that deals with the investigation and exploration of groundwater and to maintain hydro geological records. The main issue again is that the available data is not used systematically by related agencies in planning and management purposes. There is also a need for building capacity to enable modelling of the collected data, so that it can be used more effectively.

A high proportion of agriculture is confined to intermediate and dry zones of the country, where there are serious water shortages during 6/7 months of the year. The most vulnerable to drought are the rain fed areas, with no irrigation or tanks. Even the major irrigation schemes in the country could only irrigate 50 per cent of the total cultivable land. As a result a nation-wide agro wells programme was initiated under the small tanks. The subsidy provided by the ADA and favourable market and pricing

conditions for the crops grown (chilli and onions) also resulted in the rapid development of agro wells in the dry zone. As a result a total of 15,000 agro wells were constructed against the original target of 12,000 wells. In addition, many water related projects provided assistance for developing agro wells, which has contributed to the far exceeding ground water extraction in the country. At present no ground water regulation or guidelines for extraction is in place and a recent study indicated that some wells have already exceeded the upper limit in certain areas. It was also revealed that farmers irrigate their crops 50 per cent more than the water requirement and that irrigation losses are very high due to poor knowledge on crop water requirements. Drying of wells in mid season, low recovery rates, interference between wells and salinity problems have been observed in these areas. Therefore, it is necessary to prevent further expansion of agro wells without proper scientific investigation. On the other hand there is inadequate information on ground water, which is a constraint in addressing the issue systematically. This is mainly due to the reason that there is not one agency responsible for ground water development or regulation. A positive response to this effect is the execution of the new water policy and the project, which sets out clearly the principles for sustainable ground water management in the country. The institutional arrangements at national level are also in place in line with the policy.

The management of ground water resources have also been addressed under the EIA regulations with provision to control extraction levels beyond a daily extraction rate of more than 50,000 gallons. However, there has been hardly any industry that has been subjected to EIA process falling into this category. Recent studies on small tank cascade systems have also helped understand the shallow aquifers in the north-central dry zone. These studies also developed a methodology for determining the location, distribution and carrying capacity of agro wells within an individual small tank cascade.

1.1.4 Salinisation and Water Logging

Salinity is mainly associated with irrigated lands in the dry zone. Reports indicate that this is a growing problem, where the southeastern part of the country is more susceptible to salinisation. However, due to the heavy rains experienced in the dry zone the accumulated salts gets flushed off, and as a result the impact of salinisation is minimized to some extent. In addition, salinisation is also a problem in low-lying coastal areas due to over exploitation of ground water, intrusion of salt water to canals and rivers etc.

Reports indicate 364 ha out of 2700 ha in the Ingimitiya irrigation system in the northwestern part of the dry zone is seriously affected by salinisation, resulting in a loss of Rs 21 million. Similarly, it is believed that the Nilwala Ganga Irrigation scheme in the southern part of the country is also believed to be hampered due to salinisation problems in the area. Lack of studies in this area concerned is a major constraint in resolving the issue.

1.1.5 Coastal Land Erosion

Sri Lanka has a coastline of 1920 km, including offshore islands. The main economic centres are located along the coastal areas of the country and have served as main base for economic development. Coastal erosion is one of the serious environmental, social and economic problems in the country. Due to over exploitation of river sand and the subsequent imbalances in the sediment budget on the beaches, destruction to coral reefs and development along the beach front have caused coastal erosion to the extreme levels as evident today. Along the coastal segment extending from Kalpitiya to Kirundi, some 175,000 – 285,000 m² of coastal lands are lost annually through erosion (Madduma Bandara, 1989c). The Coastal Erosion Management Plan of 1998 recommended certain measures to prevent

erosion, which were implemented over the years. The shift in coastal management was evidenced with the introduction of Special Areas Management (SAMS) Plans for 21 coastal sites, which would concentrate on integrated management of sensitive coastal areas with community participation. 9 SAM sites have been identified under the ongoing CZMP, which will be implemented during a period of six years. Soil erosion prevention is also a main component of the CZMP.

In the past construction of groins, revetments, stonewalls and offshore breakwaters was constructed to prevent erosion which have had mixed results. The solution to the issue also lies in the measures taken to protect the reefs, restrict sand mining in rivers and control of development along the coast. With the enforcement to amended Coast Conservation Act of 1984, the coral mined decreased to 4,020 tons per annum in 1993 (in 1984 coral mined was 18,000 tons/annum). A ban on use of coral based lime in state building construction was imposed in 1999 and research and promotion of lime from dolomite was carried out. These new developments are expected to have positive results in controlling coastal erosion in the country.

1.2 Factors Influencing Land Degradation

1.2.1 Integration of Social –Economic Aspects

In many times the question of why certain land use practices or land use changes take place are being queried. Similarly there are also issues relating to non-adherence of soil conservation measures, water management etc that are often left unanswered. The underlying causes for such dilemma is the social and economic factors affecting the people involved. Hence, any programme to address land degradation should essentially include related social and economic elements. The related elements are discussed below.

▪ Poverty and Land Degradation

Currently about 20-30 per cent of the total population in the country lives below poverty line. The link between land degradation and poverty is straightforward; poor people in rural areas rely on natural resources mainly land for survival and do not have the ability to invest on improvements to the resource base. The adverse effects encountered in this respect are; the overuse or misuse of natural resources leading to the underlying resource productivity often being irreversibly impaired; and encroachment on environmentally sensitive areas leading to degradation of such areas.

A study focused on topsoil depletion by the Agrarian Research and Training Institute (HARTI) in 1998, confirmed the relationship between soil erosion, poverty and land tenure. The topsoil was the thinnest in encroachments on government lands where the occupation had no secure tenure. The level of erosion was the highest in the plots where the annual income was less than Rs 18,000. The topsoil was thinnest around 2.94 mm in encroachments on state lands, whereas it was about 4.4 to 5.25 mm in lands where there was secure ownership. Agricultural holdings of less than 0.2 ha had the thinnest layer of topsoil¹. Owing to insecure tenure, lack of resources and lack of required technical knowledge, many poor farmers on hilltops and hill slopes cultivate land without a semblance of soil conservation measures.

Degradation of land in environmentally sensitive areas due to poverty related actions is one of the crucial issues that need attention. Much of the state land is located in sensitive areas, upper watersheds and in forest fringes. Landless poor in rural areas use these lands either as encroachers or with various

types of permits, which do not give them any tenurial right. In allocating land to the poor there has been no proper strategy or even a policy to facilitate rational land allocation and development of sound land use systems. Lack of secure ownership, and also lack of resources at their disposal, discourages poor farmers from investing in soil conservation and other protection measures. Hence, any action to address land degradation and related impacts should essentially include elements of poverty reduction among the rural poor. In the absence of alternative livelihood opportunities the pressure on land resources will invariably increase over the years.

Poverty significantly contributes to depletion of forest cover as well. One of the main causes of deforestation is expansion of chena cultivation, which is practised by the poor. An aerial survey conducted in 1956 estimated that 15 per cent of the total land area (half a million ha) has been under chena cultivation. Of this about 0.25 million ha were in critical watersheds, which have contributed to severe soil erosion.

The coverage of the recipients of the government's poverty alleviation programme have steadily risen from 1.4 million to 2 million between 1995 to 2000, indicating the absence of a target and an exit system. These programmes are not linked to any environmental aspects, which form an important part of their sustenance. Hence, a revisit of such programmes taking environmental dimensions into account is urgently needed.

The aspect of promoting agro-industries is important in the context of alleviating poverty and easing the pressure on land. Issues such as low quantity and quality of raw materials, inadequate technology, insufficient market strategies and planning and inability to face competition are the possible drawbacks in this regard. Some efforts to this effect was made by the Ministry of Industries a few years ago but were not pursued further. This is an important area that requires attention in alleviating rural poverty and in enhancing land management in the country.

▪ **The Impacts of Land Ownership**

Land ownership and land degradation are often connected. Hence, it is important to look into these factors in detail in the pursuit to address the issue of land degradation in the country. Under the Crown Lands Encroachment Ordinance (CLEO) by the British in 1840, all land whose customary right could not be established was taken over by the crown. As a result over 90 percent of the land in the country became the property of the crown. This move is the beginning of landlessness and the root cause to land degradation prevalent at present in the country. Much of this crown land was later transferred to British planters for cultivation of plantation crops in the hill country, which is a major cause of soil erosion at present. In order to resolve the issue of landlessness, in 1935 the Land Development Ordinance (LDO) was introduced for providing a tenurial system based on permits and grants. However, due to some restrictions the occupants were not motivated to develop or improve the land, which they were uncertain of owning or using over long-term. All these aspects over the years have contributed to land degradation in its present context, which is considered as one of the serious environmental issues in the country.

In order to address the issue on right to the land, a programme a pilot project for land titling financed by the government was initiated in 1998 under the RTA. Land titling would provide a clear and secure freehold title to land, which is a prerequisite for land development, and a precondition for efficient use, trade, investment, conservation and management of land resources. Hence, it can have a great impact in combating land degradation in the long-term. The objectives of this project are to issue a Title of

Certificate guaranteed by the government (in place of the existing deed) for each parcel of land in the country by surveying and mapping, establishment of an efficient land management system and a computerized database. Titling activities are currently in progress in four Divisional Secretariat Divisions, which so far have issued Title Certificates for a total of 8749 land parcels. The titling process, in the long term is expected to catalize improvements of land productivity in rural and urban areas, establish tenure security and empower farmers and other land owners to manage their land resources more effectively by provision of a full range of market choices.

In order to enhance the benefits of this ongoing project, the International Development Agency (IDA) provided funding for a three-year learning and innovative project; Land Titling and Related Services Project (SLLTRSP) to be implemented in a few selected areas in the country. This project is expected in the long-term to facilitate environmental management, including resolving the land degradation issues.

1.2.2 Concerns on Economic Policy

Some of the subsidies/taxes imposed by the government from time to time have contributed to accelerating the land degradation issue, particularly soil erosion in the country. The fertilizer subsidy is provided to farmers irrespective of the crop and the location it is grown. Potato cultivation is a good example where the farmers are given many concessions from seeds to fertilizer and at the same time a high tax (35%) for imported potatoes was imposed in order to make the locally grown potato competitive in the market. The cost to the economy in terms of soil erosion resultant from cultivation on steep slopes in the upcountry is enormous and hence, these actions cannot be justified.

The government provides considerable amount of subsidies for the cultivation of plantation and minor export crops. The subsidies for growing tea (small-holders) has recently being increased two-fold from Rs 50,000 to Rs100,000 per ha for replanting of tea. At the same time a cultivation insurance scheme is in operation to protect small tea holders from drought losses. The expansion of smallholder tea particularly in the southern part of the country has contributed to deforestation. The encouragement provided to tea growers in the form of financial incentives has a negative impact in maintaining the forest cover in some parts of the country.

However, there is no subsidy scheme linked to conservation farming in the country, except for the assistance provided by some projects in operation in the upcountry. The necessity for a subsidy scheme for only selective crops has been discussed by Kotagama (1998) in the study on Soil and Land Degradation in Uma Oya. Mathritillake (1998)⁷ also has discussed the repercussions of the government's cash crop subsidy and emphasized the importance of introducing a conservation oriented crop subsidy scheme.

1.2.3 Deforestation and Forest Degradation

The forest cover in the country has been steadily declining over the years, from 80 per cent of the land area in 1881 to 24 per cent in 1992. The dense forest cover in the country has decreased by 20 per cent mostly in the dry zone during 1956 to 1992. The average rate of deforestation during 1956 and 1992 has been over 36,000 hectares per year. Deforestation has taken place due to multitude of pressures; planned deforestation for irrigation, settlement, purposes; illicit felling; firewood collection and chena cultivation. Chena cultivation (shifting cultivation) with inadequate fallow periods and neglected soil conservation measures is responsible for degrading about 1 million hectares of land in the country.

It is well known that forestry has a major role to play in reversing any desertification trends and in providing an excellent long-term investment in the valuable natural resources needed for continued development. Forest cover with a good canopy and litter on forest floor can reduce soil erosion and is the most effective means of soil conservation in critical watersheds. Over the years the Forest Department (FD) was instrumental in reforesting about 89,000 ha of forest plantations in the country with species like Teak, Mahogany, Eucalyptus, and Pinus etc, mainly in the dry zone and in the upcountry. In a move to conserve the remaining natural forests in the country, a moratorium on logging in natural forests was imposed in 1990, which is still in existence.

The vulnerability of the dry zone in land degradation and the importance of rehabilitating dry ecosystems for conservation and sustainable human use are widely accepted in the country. As a result the FD since early 1980s has mainly concentrated on improvements to silvicultural practices in the dry zone, where research trials have been carried out on site preparation, selection of species etc aimed at improving survival rates. Survival rates as low as 10 per cent were recorded in some dry zone forest plantations, especially those established on degraded chena lands. Mechanical soil preparation trials were carried out and silviculture manuals were prepared in enhancing reforestation efforts in the dry zone. These methods though costly have proved to be a success recording high plant survival rates.

However, there is much more to be done in reforesting degraded forest and other sensitive areas in a bid to deal with land degradation issues in the country. There is a need for a comprehensive reforestation programme in the dry zone involving the state and the non-state sector. This should be backed by a monitoring and evaluation programme for assessing the effectiveness of the programme. In a bid to reforest degraded areas in the dry zone, the FD is providing state land on long-term lease to the non-state sector. Nearly 500 ha have been leased so far and the response from the public has been encouraging. The FD is also engaged in reforesting 500 ha of degraded land and 500 ha of enrichment planting in degraded forestland utilizing government funds. In addition, the FD is also involved in village reforestation programme with the assistance of villagers on a yearly basis. Under the Man and Biosphere Development Programme, conservation related activities are being carried out in 33 natural forests.

Selection of tree species for control of soil erosion and land slides must be on the basis they have good survival and growth rates; strong, deep and wide spreading root system; little care required for survival; preferably nitrogen fixing in order to enrich soil etc. The FD recommended that *Acacia decurrens*, *auriculiformis*, *mangium*, Yellow and Giant bamboo as best suited for this purpose⁴. 4,000 ha of forest plantations have been set aside conservation forests, mainly on steep slopes over 40 to 60 per cent gradient. Under the various projects of the FD especially, under the Community Forestry Project and the Participatory Forestry Project seedlings were raised and distributed for planting in homesteads, and areas earmarked for conservation. The FD is also provides technical advise in tree planting to the public

The buffer zone concept adopted in management of forest areas is important in terms of conservation of the core area, promoting peoples participation in forest management while providing some benefits to communities. This concept has now extended to almost all important reserves and conservation areas in the country, which will be discussed in detail under the section on projects.

1.3 Effects of Land Degradation

1.3.1 Reduction in Crop Yields and Measures for Improvements

In relation to agricultural practices, besides soil erosion, unplanned irrigation leading to excessive water use and nutrient loss, indiscriminate chemical use, and damaging tillage cause land degradation. The effects of land degradation on agriculture is directly linked to the production factor. According to statistics, Sri Lanka had the lowest growth rate for agricultural production in South Asia during the decade 1991-2000, where the average annual growth rate of agriculture is recorded as 2.0 percent³. The main reason for low growth in the first six years was the fall in agricultural production in two years by 1.6 per cent in 1992 and by 4.6 per cent in 1996, mainly as a result of drought in the country. Paddy production, for example declined by 2.1 per cent in 1992 and by 26.7 per cent in 1996. Tea production fell by 25.7 percent in 1992 and coconut fell by 7.0 per cent in 1996. Since the last decade Sri Lanka has increasingly imported food and in the year 2000 rice and wheat imports accounted for Rs 286 million and 561 million respectively.

There is a limited land base available for agriculture and food production in the country, whereas the demand for food is increasing. Large quantities of artificial fertilizer and agro-chemicals are used in agriculture and the plantation sectors in order to increase production. In order to assist the farmer in utilizing the correct mixture and quantities of fertilizer a soil testing programme was launched by the DOA in 1993 at four research stations enable, farmers to know the productivity level of their field and apply fertilizer according to soil analysis data for a nominal fee. Since its inception 13,500 samples have been analyzed, while 1355 samples were analyzed during the year 1999 alone. The testing in 1999 revealed that 66 per cent and 74 per cent of the paddy soil samples has low available phosphorus and low exchangeable potassium respectively, which will be new aspect for research programme in the future.

Sri Lanka has vast potential in developing organic farming in the country. Given the environmental problems associated with use of chemicals in agricultural production, the associated cost and the increasing demand for such products in the national and international market, all possibilities for expanding organic farming should be explored. At present organic tea and fruits are being produced at a smaller scale. The Ministry of Environment and Natural Resources have set up a committee aimed at promoting organic farming and marketing. The developments of standards for organic and pilot project in the dry zone involving 10 farmer families are being carried. The expansion of these activities throughout the country especially in the dry zone is important, as means of resolving the issue of land degradation in the country.

2. POLICY AND PLANNING INITIATIVES TO COMBAT LAND DEGRADATION

The highest support towards sustainable policy and planning efforts comes from the Constitution of Sri Lanka adopted in 1998. In its “Directive Principles of State Policy and Fundamental Duties” is it stated that the “state shall protect, preserve and improve the environment for the benefit of the community”. The Constitution also places a duty and obligation on the people when it states “...it is the duty of every person to protect nature and conserve its riches”. The role of the state in meeting the objectives set out in the Constitution is expressed in the National Environmental Act, Section 8, which states the jurisdiction of the CEA in protecting the environment.

The National Environmental Action Plan can be considered as the agenda for sustainable development, within which the necessary guidance and direction to the development of natural resources based sectoral policies, strategies and plans are provided. In addition to the measures discussed above, this section will focus on policies and plans prepared since the first status report for UNCCD, which depicts the commitment of the government in dealing with sustainable land resources management in the country. These can also be considered as positive developments in terms of providing guidance and direction in combating land degradation in the country.

Natural Resources Management

2.1 National Environmental Policy (draft) -2002

In order to provide direction and guidance in environment and natural resources management in the country, an environmental policy was developed. Having recognized the importance of land as a means of sustenance of other natural resources and the people, the draft policy places much emphasis on land management. The policy statement on land is “land resources will be managed to maintain and enhance their quality, productivity and life supporting capacity to protect their ability to support a variety of land use options”. The main items of the strategies of the policy places emphasis on the development and promotion of land use systems on the following basis;

- Protect soil erosion through the stopping of inappropriate cultivation and intensive land use on steep lands through pilot land demonstrations of sustainable land use, facilitation of alternate land use practices by the catchment community group networks, provision of long-term tenure for dry land chena farmers along with agro-forestry and community forestry pilot programmes.
- Restoring degraded land through provision of incentives for adoption of appropriate land use systems, with emphasis on land diversification.
- Legal provision for alienation and management of state land
- Development of a land resources management policy
- Development of indicators of land use effects and applied in land use management
- Development of land resources database as part of national land cadastre for planning and monitoring purposes.

It is evident that the elements in the policy and strategy are essential items for enhancing the role of land resources management in the country and resolving land degradation issues in a sustainable manner. However, the preparation of an action plan is necessary in order to implement the policy effectively.

2.2 National Environmental Action Plan 2002-2006 - (draft)

Preparation of a National Environmental Action Plan (NEAP)- 2002-2006 commenced in 2001. The draft NEAP focuses on the primary natural resources of the country: land, water, atmosphere and living resources and the measures needed to ensure the protection of the integrity and vitality of these resources. The draft NEAP gives priority towards resolving land degradation issues in the country, in view of the adverse impacts it has on the sustenance of other natural resources as well as to the socio-economic status of the people of this country, and the economy as a whole.

Some of the salient recommendations of the NEAP relating to addressing the issue of land degradation are: revise the Soil Conservation Act and the associated regulations and frame additional regulations, develop new institutional arrangement to combat soil erosion and land degradation, set up and activate soil conservation / water management units at Provincial level for adopting soil conservation measures, formulate watershed management policy, identification of land users violating the Soil Conservation Act, rehabilitation of neglected tea land subject to soil erosion, prepare GIS mapping database on land in relation to erodibility, proneness to landslides etc., and preparation of land use policy implementation guidelines on a provincial basis, with accompanying indicative and zoning maps.

Promoting Sustainable Land Use

2.3 National Land Use Policy (draft)- 2002

A draft National Land Use Policy was in existence since 1996, which was not formally approved. However, during 2001 under the Sustainable Land Resources Management Project funded by UNDP action was initiated to prepare a land use policy taking into account the new developments in the country. This move is major step in providing a basis for addressing land degradation issues in the country. After a series of consultations the draft policy has now been forwarded for public comments and is due to be finalized within a few months. A comprehensive land use policy for the country is a necessity taking into account the low land: man ratio, monopoly of state ownership and the demand for land to meet multifarious needs.

The draft policy is based on the main fundamentals: i.) Land is held in trust for the people by the state for sustainable use by the present and future generations. The role of the state will be that of a facilitator/manager so that land (state & private) is utilized according to scientific land use principles keeping in mind, the traditions and culture of the people as well as the impact on the environment; ii) state will encourage private ownership of land; iii.) Land use will be based on the principles of zoning based on land capability; iv.) utilization of land will be based on land suitability evaluation; v.) decentralization of land management for balanced regional development; and vi.) adoption of integrated land management approaches.

The main focus areas of the draft policy are; agriculture and food security, land and people, and land and nature. In view of the importance agriculture in the economy priority has been given to agriculture and food security. In the attempt to move away from state ownership and encourage outright ownership of land to the people, the development of a land market and accessibility to credit for land improvements is emphasized. The policy is clear on encroachments on environmentally sensitive areas, where it states that such encroachments will not be regularized. The draft policy gives very high priority to environmental safeguards in natural resources management and provides for adequate safeguards in the protection of soils, water, forestry, climate, biodiversity, wetlands, and watersheds etc., which are essential in terms of enhancing the quality of land resources. The policy emphasises the

need to identify and protect highly environmentally sensitive areas where all lands lying above 1500 m MSL will be protected and conserved, all lands over 100 slope will be under permanent forestry/grass. The occupants of land over 60 per cent slope will be encouraged to convert such land to forestry or agro-forestry, with appropriate incentives. It further states that only activities that stabilize soil cover will be permitted in earth slip prone areas and measures will be taken to reduce the occurrences of earth slips in such areas. The policy is quite comprehensive and when implemented would have a tremendous impact on land resources management and in resolving land degradation problems in the country.

Watershed Management

2.4 National Watershed Management Policy 2001-(draft)

Under the Upper Watershed Management Project a draft policy on management of watersheds was developed. The policy highlights the need for rehabilitating already degraded land in the upper watersheds and the allocation of funds for this purpose, conservation farming, soil conservation measures, people's participation as a pre-requisite in watershed management, creating awareness and education in watershed management, creation of watershed management units at provincial level. This policy will provide necessary guidance and direction in managing soil erosion in the hill country.

Promoting Sustainable Agriculture

2.5 National Agricultural Policy and Strategy Framework– 2001-2005

The agricultural policy and strategy was expected to set the agenda and strategic direction, for the development of food agriculture sector for the five-year period. The policy emphasizes improving competitiveness of the agriculture sector by enhancing its productivity, and expanding the sector growth potential by aligning it with market driven growth. In this regard the policy emphasizes the need for crop zoning and area specialization, modernization of production and processing structures, and close integration of production and post-harvesting processing. The policy thrust in which the strategic framework is built covers areas such as: increase in domestic food production; improving productivity and sustainability; greater private sector participation; export promotion and marketing development and institutional reform.

2.6 National Agricultural Research Plan 2000-2008

In view of the importance of agricultural sustainability and increasing productivity, profitability, and self-sufficiency in food production, among the many measures taken is the preparation of a National Agricultural Research Plan 1988. In addition, an Agriculture Research Plan for 2000-2008 was also prepared. This plan proposed many research initiatives that will promote sustainable agriculture in harmony with the environment.

Controlling Natural Disasters

2.7 National Policy for Disaster Management- 2001

A National Policy for Disaster Management has been formulated to provide a philosophical basis for planning and to provide guidance for the approaches and strategies to be employed in managing and reducing disaster impacts. The policy covers areas relating to building of partnership with NGOs and community groups in disaster management and mitigation, improvements to professional practices relating to land use, agriculture, construction etc, enhancement of local capacity to prevent and handle

disasters when required, fostering of scientific and engineering innovations which are of vital importance in addressing the issue in logical manner. This new move is expected to provide direction towards the preparation of an action plan on disaster management.

2.8 National Action Plan for Disaster Management (draft)- 2002

A Natural Disaster Management Plan was prepared in 1999, and following a draft National Action Plan for Disaster Management was prepared which includes a detailed analysis of the areas of disaster important in the national context, mitigatory measures, research and technology transfer, training needs assessment, information, reporting and monitoring etc. The plan when implemented will provide guidance to policy makers in land allocation and land use decisions, and measures to prevent disasters in the future.

Promoting Spatial Planning

2.9 National Physical Spatial Planning Exercise

The Town and Country Planning Ordinance of 1946 were amended in 2000, which enabled the establishment of National Physical Planning Council. As a part this changes, action has been initiated to prepare National Physical Spatial Plans covering the entire country. The amendment does not define what physical planning is or its scope. Reference in Section 2 of the amendment states that “a national physical plan may be prepared under this Ordinance in conformity with the national physical planning policy, with respect to land, whether there are or not buildings thereon, with the general objective of promoting and regulating land, of securing proper infrastructure, amenity and convenience of conserving the natural and built environment or architectural, historic or aesthetic and of natural beauty”. Presently physical plans are being prepared on a provincial basis. The role of the plan in allocating land for conservation purposes and on what basis land will be allocated is not clear. It is important to follow-up on the work in this regard and ensures how best this plan could assist in resolving land degradation efforts in the country.

3. LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 Legal Framework

There are about 13 major legislations to ensure protection and sustainable utilization of land resources (provided in Annex 3.) However, at present there is no one single statute that applies to the management of land. The mandate of land is stretched over a multitude of statutes and authorities and the lack of co-ordination between these various authorities is a factor that hinders against proper land management in the country.

3.1.1 Amendments to Soil Conservation Act

The 1996 amendment to the Soil Conservation Act of 1951 provides for the establishment of a Soil Conservation Board and a Soil Conservation Fund. The amendment places emphasis on the enhancement and sustenance of the productive capacity of the soil, to restore degraded land for the prevention and mitigation of soil erosion, protection from damage from floods, salinity, drought, water logging, alkalinity. The Soil Conservation Board has been set up and drafting of necessary regulations is in progress. It is important that the regulations are in place early, so that effective action so as to bring the violators to justice. The implementation should be monitored and evaluated in order to assess the progress made in combating land degradation and to review the status of the small farmers in land management.

3.1.2 Amendments to Forest Ordinance

In order to implement the National Forest Policy and FSMP of 1995, the Forest Ordinance of 1907 is being amended to include a more balanced approach in forestry development in the country. The amendment will place emphasis on forest conservation, people's participation in forestry activities, and long-term leasing of forestland to the non-state sector for management and forest protection. The forest categorisation that will be included in the amendment will have provision for two types of forests, which will be under total protection. The multiple-use forest concept will provide for enrichment of degraded natural forests through management by the community and sharing of benefits by the communities. The long-term leasing of forests for management can be considered as a major step in non-state sector participation in forest management activities in the country. The provisions in the amendment will enhance the role of forestry in land management through, the increase of tree cover and protection of the existing important natural forests in the country.

3.1.3 Sri Lanka Disaster Counter Measures Act

The important aspects this Act will provide for are: National Council for Disaster Management; National Disaster Management Centre; Technical Advisory Group; preparation of a National Disaster Management Plan; Declaration of a state of disaster; award of compensation and matters connected therewith. This Act would provide the basis for facilitating the implementation of the action plan on disaster management.

3.1.4 Environmental Impact Assessment

There has been concern that environmental management on public lands have been weak over the years. There are some guidelines issued by the Land Commissioner on environmental impacts of dispositions and leases, but they have not been strictly enforced. The Environmental Impact Assessment (EIA) regulations cover some aspects of public land management, where any removal of forest cover of more than 1 ha to convert to other land uses, clearing of land areas over 50 ha and

conversion of wetlands more than 4 ha, extraction of timber over 5 ha would requires an EIA. In addition, any of the proscribed projects listed under the EIA regulations if located within 100 m of any forest reserve, or wildlife sanctuary requires approval under the National Environmental Act and is subject to an EIA. Like wise any resettlement of more than 100 families requires an EIA. These safeguards also contribute to minimizing land degradation in an indirect manner, although does not address the issue as a whole. The CEA has also prepared handbook on EIA guidelines for the agriculture sector, which will facilitate the EIA process.

3.2 Institutional Framework

National Committees

3.2.1 Committees on Environment Policy and Management (CEPOM)

The Committees on Environment Policy and Management (CEPOMs) is a co-ordination mechanism aimed at integrating environment concerns into the development agenda at national level. Since its inception in 1999, it has established strong awareness on the need to consider environmental aspects in the development programmes of the agencies concerned. One of the CEPOMs dealt with the subject of land and minerals. Taking into account the current issues and needs in the environmental sector, certain changes to the composition of the CEPOMs have now being made, so that adequate attention can be given to the environmental concerns in the related development activities of the sectoral agencies.

Accordingly, the land CEPOM will now cover agriculture, lands, mining and plantations. This can be viewed as a positive move in dealing with the complex issues of land degradation in the country. This arrangement will provide a basis to deal with the issue of land degradation as a whole, as most of the related areas of concern are included in one committee. The other CEPOMs would now cover; forestry and wildlife conservation; fisheries, coast and marine environment management; industry and tourism; energy and tourism; and health, sanitation and urban development. The Secretaries in charge of the subject area concerned and the Secretary in charge of environment jointly chair the committee. The CEPOMs can be considered as an effective forum in which matters of environmental concern pertaining to the sector can be discussed and policy decisions taken in consensus with all those concerned.

3.2.2 Committee on Integrating Environment and Development (CIEDP)

The CIEDP is linked to the activities of the CEPOM and is meant to assist in important and complex policy decisions related to the environment. Any important policy decision that would require the highest-level commitment and approval of the government are referred to the CIEDP for consideration and approval. Secretary, Ministry of Finance, chairs the CIEDP and its membership includes all Secretaries of Ministries, and national planning and external resources agencies.

3.2.3 National Expert Committee on Land Degradation and Drought

A National Expert Committee on Land Degradation and Drought was set up to advise the government on matters relating to land degradation and droughts including the implementation of the UN Convention to Combat Desertification. The committee comprise of experts in land resources, state sector officials and NGOs. The task of the committee is to provide guidance and direction towards adapting an integrated approach in mitigating land degradation and drought effects, on matters related

to allocation of land, provide advice on policy matters, recommend strategies and laws etc. This committee is also expected to oversee and guide the preparation of the National Action Plan to Combat Land Degradation. Selected Experts on the subject concerned have been requested to provide position papers on specific thematic areas related to land degradation and drought, which will be used as inputs in the preparation of the action plan.

3.2.4 National Committee on Social Development

This Committee comprises of senior officials from agencies dealing with social development, forestry, environment, disaster, population etc who will assist in the implementation of the *Copenhagen Declaration and Agenda for Action*. This committee would be one link in which the related land degradation issues can be discussed and action taken

National Agencies

3.2.5 Institute of Post Harvest Technology

The IPHT was established in the year 2000, for the purpose of carrying out post harvest research and development work in rice, vegetables, fruits, grains, other field crops, and ornamental plants. This institute also is involved in rice processing and research and development activities. The main objectives of this institute is to prevent post harvest losses occurring in the crops mentioned above, value addition to the produce through improvement of product quality, development of viable agro/food processing technologies, and the prevention of nutritional losses. The institute has planned many programmes to be carried out that would induce increase in crop yields and would also enhance farmer incomes. Development of agro processing enterprises at rural level, the institute among other activities is carrying out improvements of farmer level storage for food security etc.

3.2.6 Water Resources Secretariat and Council

The Water Resources Secretariat and Council were formally established in 1996. The composition of the Water Resources Council will include senior officials of all relevant Ministries dealing with water resources, NGOs, private water users, etc. The Council is expected to provide advice and guidance in water management matters including resolution of inter-provincial and inter-agency water disputes, co-ordinate of related activities, etc. The Secretariat will provide the necessary support to the council in conducting the assigned tasks. Since its inception the Secretariat was responsible for the development of the policy on water management and co-ordinating water resources related matters. In view that water is a resource that impacts and has a bearing on a host of other resources and the multiplicity of institutions that are involved in overseeing it, the creation of an apex institutional to deal with water resources at national level is a positive development in systematic management of the resource in the future.

3.2.7 National Water Resources Authority (proposed)

The establishment of the National Water Resources Authority (NWRA) is one of the recommendations of the National Water Resources Policy of 2000. The NWRA will be the water sector apex body responsible for co-ordination, planning, regulation and monitoring national water resources in the country and will work in close cooperation with the Secretariat and Council. Activities related to policy, river basin and other water resources planning, information management, water allocation, drought and flood management control of riverine activities, awareness creation in water management etc will be carried out by the authority. The Board of the NWRA will consist of technically

knowledgeable persons in water resources management and planning. The establishment of the authority is expected to further strengthen the efforts in water resources management in the country.

3.2.8 Water Resources Tribunal (proposed)

The proposed tribunal will be an independent appeal body, which would meet as and when required and would serve water users and other parties affected by the administration of water resource entitlements by the NWRA. The tribunal will have the necessary independence to operate within the framework of activities assigned and its judgement will be final apart from appeal to the courts on matters of law.

Sub-National Agencies

3.2.9 Watershed Management Units

In order to maintain sustainability of the work carried out under the UWMP and creation of ownership in watershed management, the formulation of the Watershed Management Units at provincial level was suggested. These units will be responsible for ensuring co-ordination of activities of line agencies with respect to watershed protection, ensure that necessary focus is given to watershed management in planning exercises of line agencies, work closely with local communities in watershed management etc. At present one such unit has been set up in the Uva province on a pilot basis, which will be expanded to other areas with certain modifications.

3.2.10 River Basin Committees (proposed)

The RBC will be a legal body with a clearly defined advisory role and is expected to provide a critical link to provincial, district/divisional/local government and other stakeholders at local level at the river basin level. The NWRA will work with the committee in the development of river basin plans, and in other water management related policy and planning matters. The Committee will be the focal point for facilitating stakeholder participation in all water management activities at the grass root level.

3.2.11 District Coordination Committees

In line with the devolution of power to the provinces, more decision-making authority is being given at provincial and local level. In this respect it is considered important that the local authorities take responsibility in managing the environment. At the district level there are a large number of committees to deal with environmental and natural resource issues of the district. The Environmental Law Enforcement Committee, Land Use Committee, Forestry Committee are some of the district level committees that are chaired by the District Secretary and attended by all district level officials dealing with the subject matter. Some of these committees have been very effective in dealing with the pressures imposed on natural resources in the districts and maintaining a balance between development and conservation. Matters land use conversions are referred to the Land Use Committee, which would act on the report submitted by the District Land Use Officer. This mechanism can be considered as effective in resolving issues at grass root level. Only major issues are referred to the national agencies and a fair amount of resources can be saved as a result of this arrangement.

In order to further strengthen the activities of the district level decision making, CEA has appointed District Environmental Officers to almost all Divisional Secretariats in the country. The mandate of these officers is to assist in environmental management matters, co-ordinate such activities with the national institutions and the local level authorities, create awareness on environmental aspects etc.

4. PROJECTS AND PROGRAMMES ON LAND RESOURCES MANAGEMENT

There have been a large number of projects and programmes implemented which were directly and indirectly linked to land resources management in the country. Even at present there are many foreign funded projects assisting the government in dealing with soil conservation, land resources management and other related land aspects. These projects have enabled the development new policies and new concepts in soil conservation, including the importance of public participation and co-management of natural resources. It is important to note that these initiatives have assisted to a large extent in creating a strong awareness among the communities on the seriousness of the problem, stabilizing the problem to a certain extent and hence, reducing the serious impacts of land degradation as a whole.

Land Resources Management

4.1 Environmental Action 1 Project (World Bank) 1996-2002

The Environmental Action 1 Project commenced in 1996 and consists of three components; institutional strengthening in environmental policy planning, Pilot Land Management (PLMC) and the Community Environmental Initiative Facility (CEIF). The project has conducted many studies relating to land resources and related subjects during 1998. Studies on soil erosion under various land uses, the cost of soil erosion to the national economy etc was carried out and many policy recommendations were made to resolve the issue. The recommendations were discussed at the CEPOMs and have been included in the NEAP recommendations.

Under the PLMC and the CEIF field level interventions were taken to address land degradation issues, especially soil erosion in the country. CEIF provided financial assistance to Community Based Organizations to undertake and implement environmental related small-scale projects at local level. Of the total 410 community based environmental projects presently implemented under the CEIF, 118 are land based projects mainly addressing land degradation issues; such as soil conservation, tree planting, production and use of organic fertilizer, reduction in the use of chemical fertilizer and pesticides, water management etc. What is unique in these projects are that the projects were designed by the community and implemented mainly by the community, with technical inputs from experts depending on the need.

The PLMC is operational in 9 micro catchments in the Central Province where soil erosion is acute. Its main activities include: i. testing and developing on a watershed basis appropriate technologies for minimizing land degradation; ii. examining the feasibility of participatory management of the micro-watersheds by the beneficiaries; and iii. defining technical and investment criteria that would prove useful in replicating watershed development activities in other hilly areas. Under this component a package of land and crop management technologies suitable for a given agro ecological and socio-economic environment would be identified. Work carried out have revealed that soil erosion from rice farming lands are very low and as such rice farming is believed to form one of the most stable land use systems in the country. At present 5 integrated farming system models and sub-models have been developed as given below;

- Plantation crop (tea): rehabilitate and replant degraded and marginal tea land; replace seedling tea with VP tea, introduce conservation forestry or any other permanent land use for steep, degraded tea lands, and adopt stone terracing and lock and spill drains.

- Integrated farming-intensive vegetable cultivation in combination with animal husbandry (stall-fed): promote bench terracing as much as possible, develop efficient run off water disposal systems within and outside farm holdings, use of sprinkler/drip irrigation, split fertilizer application to reduce leaching losses, use of poly tunnels, adopt agronomic soil conservation measures such as mulching, strip cropping.
- Integrated farming-animal husbandry (grazing) under coconut, export crops and home gardens: adopt lock and spill drains or contour bunds or stone terraces in annual crop lands depending on the slope of the land, drainage etc., adopt moisture conservation measures, encourage production of compost using cow dung and other wastes, plant fodder grass in marginal lands, coconut lands, stream reservations and adopt fire protection measures.
- Export crops and agro-forestry: identify land prone to landslides and persuade owners to leave them under natural vegetation, evict encroachers, and adopt moisture conservation measures to avoid plant damage due to prolonged dry conditions, vegetable cultivation carried out on bench terraces, width of terraces to be decided based on soil depth.
- Fruit crops: provide incentives for agro wells, use of organic manure: promote lock and spill drains or contour bunds depending on slope and soil drainage.
- Homestead development: promote agro forestry in homesteads with shallow soils, steep slopes, cultivate export crops as per guidelines provided, promote runoff water harvesting technology.
- Agro-forestry: identify suitable tree species, prevent fire and animal damage.

4.2 Land Titling and Related Services Project (World Bank) 2002-2004

This project was meant to support the ongoing title registration work carried out in a few areas in the country. The objective of the project is to support the improvement of socio-economic and environmental conditions of the people by increasing the economic productivity of land resources. Productivity gains from long-term implementation of titling, is expected to facilitate efficient land management that would enable combating land degradation. Three sites selected for their variations in topography, land use and ownership patterns have been selected for the project. The two components of the project are; improvements of field operation methods and development of institutional framework and capacity. The lessons learnt from this project will be used for further work in land titling in the country.

Natural Resources Management

4.3 Forest Resources Management Project (ADB)- 2000-2007

The Forest Resources Management Project (FRMP) is involved in implementing the National Forestry Policy and part of the FSMP. As an initial step in forest conservation, 13,000 kms of natural forests and 4,000 kms of forests plantations will be surveyed, demarcated, and categorized into five forest classes for management purposes. This will enable the creation of a national forestry estate and provide for adequate protection of the remaining forests in the country. The preparation of integrated management plans with adequate participation from all stakeholders concerned, establishment of 8,600 ha of community based small agro-forestry woodlots, improved management of 7,300 existing farmer woodlots, rehabilitation and management of 12,600 ha of degraded forest plantations, buffer zone development for multiple use forestry, private sector participation in forest management, awareness and education especially for school children are the main activities under the project.

The outcomes of this project will have a great impact in addressing the land degradation issue in the country, as forestry can play a major role in rehabilitating land degradation and mitigating the process. This is mainly achieved through protecting the existing forest estate, effective management of the forests and obtaining peoples participation in enhancing and managing the forest cover etc. Conservation of critical watersheds and management of multiple use forests mainly in the dry zone will no doubt resolve some of the land degradation issues persistent in those areas.

4.4 Protected Area Management & Wildlife Conservation Project (ADB) –2002-2008

The Protected Area Management & Wildlife Conservation Project is aimed at enhancing the protected area and wildlife conservation in Sri Lanka. The project components include: enhancing institutional capacity for protected area management; participatory adaptive management of pilot protected areas; collaborative conservation planning and sustainable financing for community partnership building. The activities will facilitate community participation in protected area management and planning and eco-tourism development in wildlife areas. These activities will enhance wildlife management, provide income-generating activities to communities around the protected areas and improve participation in management. This is very vital in terms of poverty evident among people living around protected areas and the destruction to crops from wild animals. The project is particularly important in view that protected areas account for 12 per cent of the total land area in the country and the project would assist in the management of six important protected areas.

4.5 Participatory Forestry Project (ADB)- 1993-2000

The objectives of the Participatory Forestry Project was to increase tree cover and thereby create employment opportunities, increase income and rehabilitate environmentally degraded areas and to build capacity in the FD to under take non-forest tree planting, adaptive research, extension delivery systems and facilitate the setting up privately operated nurseries. At the end of the project 36,000 ha of homestead planting, 9,678 ha of farmers woodlots, 4,600 ha of protective wood lots, 2,400 ha planting in public places, and 1,300 ha of roadside planting were carried out. The project, which was operational island wide, was able to contribute towards increasing tree cover in the country and rehabilitating degraded areas. A Tree Seed Centre was also established under the project in order to supply good quality planting stock to tree growers in the country.

4.6 Small Grants Programme- GEF and Government of Netherlands

Small scale localized environmental projects are being implemented by NGOs and Community Based Organizations from grant funds provided by the Global Environmental Facility for the past few years. The project areas implemented mainly cover biodiversity conservation, renewable energy and land based. The majority of projects implemented were land based, where tree planting was given priority. Similarly the Government of Netherlands also provides small grants to NGOs/CBOs towards implementing environment-based projects throughout the country. The second phase of this programme is now under way.

4.7 Coastal Zone Management Project (ADB)- 2000-2005

The objective of this project is to arrest the increasing loss and degradation of coastal habitat and prevent the overexploitation of coastal fish stock in order to ensure sustainable development and management of coastal resources through an integrated, participatory and community based approach. Coastal stabilization is one of the main components of the project, where activities connected to minimizing adverse impacts of coastal erosion will be carried out through the establishment of physical

structures and promoting a shift in erosion management from defensive to preventive by the conducting studies, monitoring and establishment of a coastal engineering data centre.

Watershed Management

4.8 Upper Watershed Management Project (ADB)-1998-2004

The project was meant to implement the soil and water conservation concerns expressed in the Forestry Sector Master Plan (FSMP). The aim of the Upper Watershed Management Project (UWMP) is to rehabilitate, sustainably manage and protect critical watersheds, through integrated participatory watershed management practices and strengthening the capacity of agencies in charge of watershed management. The project is operational in four main upper watersheds in the country, which are severely degraded and needs rehabilitation. It is expected that 61,000 households and 270,000 people would benefit from the project. The project aims to establish 4000 ha of buffer zone area, 40 km of stream reservations, 3000 ha timber farms, 15000 ha home gardens, 380 ha of boundary survey, and planting, and 4000 ha of off farm conservation within a period of six years.

The project, which began late 1998, is considered a success mainly in terms of obtaining community participation in sustainable land management. In order to institutionalize the watershed management concept in the province, Watershed Management Units are being set up at the provincial level, where the staff will be given the responsibility of continuing the work initiated once the project is completed. Mapping of the area in order to identify sensitive areas has been complete and encroachers farming or residing in sensitive areas will be relocated. Off-farm income generating activities such as bee keeping, cattle rearing are being promoted in order to relieve the pressure on land and to provide people with supplementary income. Farmer training in soil conservation and enrichment, and awareness creation is being carried out on a continuous basis. The project when completed is expected to resolve some of the on-site and off-site impacts of land degradation mainly in the hill country. It is important that similar activities are initiated in other watershed areas not covered by the project, if the full benefits of the initiatives already in place are to be sustainable. This must also be coupled with an effective monitoring and evaluation system, for assessing the impact of the project activities.

The mid-term review of the project has recommended: the creation of soil conservation units in each province attached to the Provincial Department of Agriculture; setting up of watershed management committee's in each province headed by a Technical Officer to assist in soil conservations matters. There is also a recommendation to prepare a National Watershed Management Act in order to implement the proposed policy.

Controlling Natural Disasters

4.9 Landslide Hazard Mapping Project 1990- UNDP

Phase 1 of the Landslide Hazard Mapping Project executed by the National Building Research Organization (NBRO) can be considered as major achievement in landslide disaster reduction in the country. Under the project NBRO institutional capacity in carrying out land slides studies and associated services was provided. It also enabled NBRO to develop a comprehensive methodology for hazard donation. The project also provided assistance to strengthen the capacity of the Geotechnical Engineering Laboratory of the NBRO to carryout high-level research on the area concerned. On completion of hazard mapping in two districts (Badulla & Nuwara Eliya). Having, realized the importance of continuity of the project, the government decided to implement a phased out programme

on landslides hazard mapping to cover all the landslide prone districts of the country and implement the project in stages. Accordingly two districts will be completed during 2000-2004 under Phase II of the project and two other districts will be completed during 2004-2005. These maps will play an important role in site selection and development planning including housing and infrastructure in sensitive areas in the country in the future.

5. TECHNICAL MEASURES FOR REHABILITATING DEGRADED LAND

Measures for rehabilitating degraded land is a combination of policy, planning, legal, instructional efforts and technical inputs. Traditional know-how and innovative research carried out by the various agencies dealing with land are used in the prevention of land degradation and restoration of such land. The NRM of the DOA, FD, NSF, TRI, RRI, CRI, Universities and private researchers are involved in research in areas related to soil conservation, conservation farming, productivity improvement etc. The DOA is mainly involved in disseminating such information to farmers through its extension network, while the other agencies operate through their field staff in their respective areas concerned. Projects have served as an important source of implementing new methods of soil enrichment and conservation etc,

5.1 Research

The NRM has been involved in research on land and water resources since 1973. In the case of dry zone, research on water balance studies in the minor tanks commenced in mid seventies (Somasiri, 1979) and continued during the eighties (Dharmasena,1985). This work was further expanded to determine the water use by different vegetation in dry zone catchments (Munasinghe & Somasiri, 1992). Some of the important subject areas of research carried out are given below;

- Hydrological processes under different land uses (mixed perennial cropping systems, hedgerow cropping system, grasslands and natural forests) in the mid country
- Effectiveness of hedgerow system on soil conservation in different soil, slope, and crop combinations on sloping land in the mid and up country areas
- Water balance studies in minor tanks

In addition, the FD is also involved in research on forest tree species, agro-forestry systems, etc. The Universities are a larger source, where research on all aspects of land resources management are being conducted.

5.2 Measures

Some of the important measures practiced in the country for preventing soil erosion and land degradation and improving soil productivity discussed briefly below;

5.2.1 Prevention of Soil Erosion & Restoration

- **Soil Conservation Bunds and Drains:** Bunds made of stone across the slope of contours and drains are being built in order to prevent soil erosion and mainly to prevent salination of reservoirs in the dry zone. Depending on the soil type the height of the bund and the depth and width of the drain is constructed.
- **Mechanical soil conservation measures adopted in tea lands:** This include systems of drains (lock and spill type) and contour terraces. The contour drains are meant to allow maximum absorption of water and to lead away the excess water from the land at non -erosive velocities. The contour terraces preferably built with stones are very useful in steep lands in reducing soil erosion.
- **Tree and Grass Hedges:** Trees such as Gliricidia, Vetiver, and Citronella were introduced which formed hedges to control soil erosion and restore already degraded land. At present the cultivation of lemon grass on hedges is promoted as it has a good export market.

5.2.2 Conservation Farming

This system was developed by the Department of Agriculture enable the use of land and water in sustainable agricultural production, while conserving soil fertility and soil moisture and minimizing the use of inputs of energy, machinery, fertilizer and pesticides. The components of conservation farming include combination of crops with trees, pasture etc. depending on the land suitability, mulching to increase soil moisture retention and to effectively use the limited water, adaptation of contour bunds and drains and stabilization by biological means, green manuring, and integrated pest management.

- **SALT:** Introduced to Sri Lanka from the Philippines is now increasingly practiced in the mid and hill country. This is an ideal system to grow tea and annual crops with minimal soil erosion. The system includes hedgerows of tree species along contour lines with crops. The soil control is done through intercepting runoff and sediment and encourages deposition on site. Farmers who used this technique have reported improved harvests while reducing their fertilizer application by as much as 40 per cent⁵.
- **Use of Organic Fertilizer:** The use of organic fertilizer is being promoted, in lieu to chemical fertilizer for restoring land and improves productivity. While the use of chemical fertilizer is on the way out, the superiority of organic fertilizer is becoming increasingly obvious. More farmers are now aware of its impact on soil, plant growth and high yields. A local firm is expected to produce quality certified organic fertilizer in Sri Lanka and make it available to 74,000 farmers at a reasonable price. This firm is due to establish seven plants to manufacture organic fertilizer. The organic fertilizer will have certain qualities such as slow nitrogen release, multiple forms-granules, tea sized and micro sized powder, pellets or liquid-free of pathogens and weed seed and is not hazardous to human or animals⁶.
- **Kandyan Home garden:** This was in existence for centuries in the hill country and is a mixed crop system where a variety of fruits, spices, timber and food trees are grown while containing soil erosion. It also provides a good income to the households. Run off studies carried out in the Kandyan home gardens have shown minimum soil loss, even on slopes 50 per cent.

5.2.3 Water Management

- **Rain Water Harvesting:** In certain parts of the dry zone, coastal belts with salt water intrusion into ground water, and some uphill localities in the wet zone, rain water harvesting remains an important, and sometimes the sole source, of water. In response to this need a rain water harvesting forum was established in 1996, consisting of officials from state, non-state sector, NGOs and universities.

Rain water harvesting is a simple technique currently operational mainly at household level. Rain water is collected off roofing made of asbestos, GI sheets or tiles, and directed through a gutter to a storage tank. Gutters can be of bamboo or PVC. The most commonly used are brick-built tanks, Ferrocement tanks and clay pots and could be built under ground or over ground. This method is gaining popularity in the dry zone, where most households use this method for obtaining their water requirements.

5.2.4 Prevention of Coastal Erosion

In addition to the coastal protection structures such as groynes, revetments, stone walls, and off-shore break waters constructed over the past years the following new methods are being adopted in addition to the policy, legal and management measures in reducing coastal erosion.

- **Beach Forests:** The establishment of beach forests were tried out for improving beach stability.

- **Beach Nourishment:** A new approach such as “beach nourishment” in which sand has been replenished from offshore sources have been tried out in the beaches north of Negombo and is considered an effective measure in minimizing soil erosion.

6. RESOURCE MOBILIZATION

Resources in terms of financial and manpower are required for effective natural resources management in the country. Similarly resources are required at national level mainly for activities relating to policy development, planning, legal, and co-ordination and at the provincial/local level for implementation. In view of resource scarcity and in line with the partnership concept, the government and the non-state sector need to contribute towards resource management activities. The involvement of the private sector in management of natural resources such as forestry, wildlife etc has been emphasised in the related policies and plans, as a means of improving efficiency in management.

6.1 National Level

Finances from the government are made available through the annual budget allocations in the form of recurrent and capital. The recurrent allocations are mainly for salaries and maintenance activities connected to the development activities carried out by the agencies concerned. A large portion of the capital or development budget consists of funds provided through loans or grant funds. The major donor agencies involved in assisting natural resources management aspects including land are the Asian Development Bank (ADB) and the World Bank. In addition, the United Nations Development Programme, AusAid, GEF, government of Netherlands also provide loan and grant funds towards environment and natural resources management in the country.

During the past years the allocations from the government for development-oriented activities has been reduced drastically and as a result the allocations made towards conservation-oriented activities has also being reduced. The state agencies such as the FD and the DWLC, have its financial allocations from the government and also rely on funding from donors for carrying out its activities. During 1990 –2001 the Government and foreign aid allocations with regard to projects to improve institutional and policy framework for promoting land management was Rs 1609 million and Rs 5286 million respectively. The funding provided by the government and projects leading to land management are given below. Although the funding is provided at national level, the major part of the funding is utilized at provincial and local level in the implementing of field level activities. A certain portion of fiancés for capacity building is also made use of at provincial and local level. Similarly national level agencies also allocate finances for community based activities, including land related activities. The breakdown of the allocations for various land-based activities is given below.

Financial Allocations for Land Sector 1998-2000

	2002		2001		2000		1999		1998	
	CF	FA	CF	FA			CF	FA	CF	FA
PLMC	4	18	7	21	17	37	12	33	-	
CEIF	44	111	30	70	11	11	12	58	-	
UWMP	89	237	67	164	52	267	30	90	30	50
FRMP	65	207	59	186	-		-		-	
FD	44		102		88		89		81	

CF- government funds FA-Foreign aid

Note: FD funding is for research & education, rehabilitation, conservation and management of forest resources

6.2 Provincial and Local Level

The Provincial Councils are allocated funds via government transfers for the development activities in the Province. A small amount of funds are also generated within the Province from the taxes, fees, charges etc collected within the province. However, the funds available to the province and local authorities are believed to be insufficient, causing difficulties in allocating funds for environmental related activities. In order to provide the necessary support at the provinces/local level, provincial based projects are being implemented with foreign donor funding. During the past the integrated rural development programmes implemented at district level, attempted an integrated approach in development where forestry, irrigation, agriculture, social, health, infrastructure etc was covered under the projects. At present there are several donor-funded projects at provincial level aimed at strengthening the capacity of the provincial level authorities.

6.3 Non –State Sector

The areas under the plantation crops, the agricultural land, and other allotments are managed by the non-state sector for which their own investments are made. The projects in operation provide assistance towards conservation farming, measures for prevention of soil erosion, involvement in off-farm activities, training and awareness creation etc that would enhance land management as a whole. The number of NGOs/CBOs operating at local level has increased over the years. With the provision of donor funding, the local NGOs/CBOs have increasingly secured the capacity to implement natural resource based projects at local level. In order to build capacity the NGOs/CBOs are provided with training opportunities.

7. PARTICIPATION AND COORDINATION

In order to obtain the maximum benefits of participation it should all stakeholders in planning, implementation and evaluation. Participation and coordination are very often linked to each other. There has been much effort and progress in adopting a participatory process from policy and planning stages to implementation. The various implementation activities in relation to land management necessarily involve the communities concerned, but their involvement in policy and planning has been minimal. An opportunity for the NGOs/CBOs to be involved in planning and designing of projects has been provided with the implementation of environmental projects funded under several projects. However, there is concern and caution on the limits of participation and there is a need to consider this matter on case-by-case basis.

7.1 Policy Level

Participatory approaches to natural resources management is now an acceptable norm and forms an important principle in all natural resource policies and plans in the country. The preparation of national level policies, plans, strategies, legislation etc is carried out with the participation of all stakeholders including, to a lesser extent the public as well. Adoption of participatory approaches was identified as one of the strategies in sustainable watershed management in the FRMP of 1995. All policies contain the element of participation and it is an accepted norm that policies, plans and even implementation must be carried out with the participation of all those concerned. The recent policy initiatives with regard to environment have advocated decentralization of decision-making and implementation at provincial, local and community level, so that environmental sustainability can be achieved.

7.2 Implementation Support

The concept of participation in the natural resources sector was initially introduced in the early 1980s under the Community Forestry Project implemented by the FD. The implementation of the activities of the projects in watershed management, land management which were given in detail in section 8 of the report, are being carried out by the communities concerned. When the communities clearly observe and reap the benefits of the interventions, their fullest participation can be obtained. This aspect has been proved at the level of participation in the UWMP in particular. On the other hand, the NGOs and the CBOs to a great extent have shown interest in taking over responsibility of natural resources management at the village level. The national agencies have at all times provided support towards capacity building through training, so that these groups could take over the enhanced responsibility. Many projects provide training to community groups and NGOs and farmers to this effect. Farmers are also being sent on study tours to Asian countries so that they could observe and learn new techniques. In the SCOR pilot sub-watersheds a leadership pattern emerged from the community with leaders of groups, organizations and companies aimed at production and conservation (Wijeratne, C.M. 1997).

Similarly, the involvement of school level participation in environmental activities has increased over the years. The Environmental Brigades formed in schools around the country are provided with awareness on environmental aspects, provided with opportunities to carry out environmental projects, compete in competitions aimed at increasing their knowledge on environmental aspects etc. It is expected that capacity building and creating awareness at a younger age, will enhance their role in environmental management in the future.

8. LINKAGES TO OTHER RELATED CONVENTIONS

In view of the cross cutting nature of land resources and its link towards the sustenance of most other natural resources, it is necessary that links be established with other relevant conventions to which Sri Lanka is signatory to. The most related conventions in this regard are the UN Convention on Climate Change and the Convention on Biological Diversity. The review reveals that these Conventions adequately relate to land degradation aspects and make very effective recommendations to combat land degradation in the country.

8.1 Climate Change

Global warming is expected to lead to a rise in sea level, higher temperatures, more frequent and prolonged droughts and high intensity rainfalls. All these impacts have a direct bearing on land resources and its productivity. The National Communication on Climate Change has analyzed these impacts and vulnerability in detail. As a result of sea level rise and increase in erosion rates the highly populated coastal areas will be directly affected. Salt-water intrusion will affect low-lying agriculture and fresh water intake. As a result of temperature rise is expected to deplete soil moisture and extinction of certain crops, which will damage agriculture in the country. Droughts again will have severe impacts on agriculture and forestry, availability of ground and surface water etc. High intensity of rainfall would increase soil erosion. All these impacts will lead to accelerate land degradation.

In order to mitigate and adopt to this likely situation the recommendations made are: establish forests and other vegetation on degraded land; promote mixed cropping and agro-forestry instead of monoculture wherever possible; efficient water management systems, changes in land use patterns in landslide prone areas, and use fast growing fuel wood in place of coal or oil to preserve carbon reservations. In the case of coastal areas it is recommended that close monitoring of meteorological parameters and the protection of critical coastal areas. In respect of water resources it suggests encouragement of water storage, regulation of ground water extraction and promotion of participatory micro-watershed management. On the policy side, it recommends the revision of the agriculture policy to include elements of climate change, preparation of land use plans for coastal areas, etc.

8.2 Biological Diversity

The Biodiversity Conservation of Sri Lanka: Framework for Action was prepared in fulfilment of the Convention on Biological Diversity. The framework for action analyses the major ecosystems forests, wetlands, coastal and marine systems and agriculture systems in detail and its importance in biodiversity conservation. The main action recommended under agriculture is; encourage the leasing of land for agro-forestry and mixed cropping on traditional home garden type, security of land ownership, provision of economic incentives for conservation purposes etc.

It is necessary that the recommendations be considered in the preparation of an Action Plan to Combat Land Degradation in the country, as they would provide necessary support in dealing with land issues at present. In order to maximize the benefits of the Conventions, it is very important that the Conventions on land degradation, biodiversity and climate change work very closely and link the actions proposed in a composite action plan for the country. Since the focal point for all three Conventions are the Ministry in charge of environment, this task will not be difficult.

9. CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

It is encouraging to note that in general there have been many positive developments towards combating land degradation in the country, which proves the commitment of the government towards sustainable management of land resources in the country. There is adequate number of policies and plans to cohesively deal with the issues relating to land degradation in the country. The policies with regard to environment, water, forestry, wildlife, coastal, etc all contain elements that promote sustainable land resources management. The most recent initiative to develop a land use policy can be considered as positive move in land management in the country. Similarly, there are institutions and coordination mechanisms to provide the necessary support in implementing the policies and plans. With regard to laws although most have adequate provision, there are drawbacks in terms of implementation. In order to rectify this deficiency the laws have been amended and regulations are being drafted. Priority has been given to land resources in most projects as its sustenance is considered as an important element in natural resources management. Therefore, most natural resource based projects being implemented at present, essentially contain elements of land management in various forms. The initiatives on land titling are a major step in formalizing land management in the country, as this would provide a basis for investments in land management.

However, in view of the complexity and magnitude the problem, there is much more to be done in dealing with land degradation as a whole and in seeking long-term and sustainable solutions. It is clear that the combating land degradation will involve long-term integrated strategies that should focus on land rehabilitation, conservation and sustainable land and water management within a community based participatory approach.

The recently concluded Technical Assistance (TA) on Sustainable Natural Resources Management for Development was aimed at formulating a process for integrated natural resources management. In conclusion, the TA recommended that land resources management be given priority in all future endures related to natural resources management in the country. In this regard the TA emphasised the need to amend the laws relating to land, and possibly develop one law to deal with land related issues in a cohesive manner. The creation of an apex body or Land Secretariat was also proposed in order to have adequate authority to deal with land related issues in an effective manner.

9.2 Proposed Recommendations

The recommendations are based on the discussion and proposals made at made a various forums on land degradation over the years. It is necessary that composite action is taken to deal with the whole issue, rather than project based approaches. Taking into account the magnitude of the problem and its impact on the nation as a whole, the following recommendations are made in combating land degradation in the country.

Management Approach

- Adopt an integrated approach in land resources management. While the main focus would be on the land base, other resources such as water, biodiversity etc should be included in the land management. Concerns on land ownership and poverty should also be addressed, where provision for agro industries must be provided.

- A package for enhancing land management must be introduced which should include technical, and financial inputs. Provision of subsidies/incentives for encouraging conservation.
- A Land Care Movement type operation should be initiated which should include land management on a watershed basis. Community groups in co-ordination with local/provincial authorities would be responsible for facilitating watershed management activities in a particular area. The watershed management groups initiated by the PLMC could be a good starting point in this regard.
- Promote ecologically sound and economically sustainable agriculture. Much attention should be diverted towards research and development based on current needs. The main target group should be the vulnerable groups living in rural areas under extreme conditions. Highest priority should be given to technology development of soil conservation and rehabilitation, which should invariably include organic farming and agro-forestry approaches.

Planning Approach

- Obtain approval for the Land Use Policy and prepare and implement a Land Use Action Plan in co-ordination with all stakeholders.
- Aim towards developing Land Resources Management umbrella legislation in the long-term that would establish the principles that will be applied to resource management legislation, and land regulation by the sector agencies in accordance with sector policy. The principles need to address mainly the role of private decision making versus the role of the public sector, the use of markets versus command and control management techniques, devolved functions and the roles and responsibilities of all stakeholders, participation and involvement etc.
- Carryout a detail survey in assessing the magnitude of land degradation in the country, which is a pre-requisite for any planned action to deal with the issue.
- A monitoring body comprising of all stakeholders should be established at local level and national level to assess the all initiatives in combating land degradation.
- Design comprehensive information systems on land resources that would assist decision-making. The database should be linked to a land resource monitoring system with provision for regular updating.
- Review of fiscal policies that are contrary to effective land management efforts and made recommendations to the authorities concerned.

Annex 1

Table 1: Land Distribution and Ownership 1990

Land Category	Area (million ha)	Share (%)
State owner	6.57	84
a. Large inland waters	1.2	18
b. Forests and Reserves	2.18	33
c. Agricultural land	1.72	27
Of which		
c.1 LDO lease	0.82	13
c.2 Land Reform Commission	0.41	6
c.3 Tree Crops Plantations	0.25	4
c.4 Mahaweli	0.14	2
c.5 Swarnabhoomi grants	0.10	2
c.6 Other	0.40	6
Privately owned	1.07	16
Urban area	0.21	3
Of which –privately owned	0.17	2.5

Source: Wijetunga, A .A., and Berugoda, S. 1998

Annex 2.

Table 1: Soil Erosion by Regions

Location	Extent of soil loss – Tones/ha/year
Hill Country	412
Mid Country	1,026
Low Country	147

Source :El Swaify (Hawaii) 1983

**Table 2: Estimated Extent of Land Subjected to Soil Erosion
(as a percentage of total land area)**

District	% of land area
Colombo	2.3
Gampaha	2.4
Killinochchi	8.0
Kalutara	11.1
Mulativu	14.6
Mannar	17.1
Kegalle	17.3
Galle	20.6
Jaffna	22.7
Matara	24.4
Kurunegala	26.5
Vavuniya	28.2
Puttalam	28.6
Polonnaruwa	28.7
Batticaloa	30.9
Matale	38.1
Ampara	38.9
Kandy	41.0

Ratnapura	42
Moneragala	42.5
Hambantota	42.8
Badulla	54.8
Trincomalee	55.0
Nuwara Eliya	58

Source : N.B.Nayakekorala

Table 3: Soil Erosion rates under different Crops in Nuwara Eliya District

Tobacco	70mt./h/yr.
Capsicum	38mt./h/yr.
Carrots	18mt./h/yr.

Source : Stocking (1992) and Bandaratileke (1999)

Annex 3.

Table 1: Major Legislations Dealing with Land Resources

Crown Lands Encroachment Ordinance No 12 of 1840

Lands Resumption Ordinance No 4 of 1887

Forest Ordinance No 16 of 1907, amendments No 3 of 1945, No13 of 1966 & No 13 of 1988

Fauna and Flora Protection Ordinance No of

Coast Conservation Act No of

Land Settlement Ordinance No 20 of 1931

Land Development Ordinance No 19 of 1935

Fauna and Flora Protection Ordinance No 2 of 1937, amendments Act no 2 of 1996

State Lands Ordinance No 8 of 1947

Land Reform Law No 1 of 1972

State Lands (Recovery of possession) Act No 7 of 1979

Urban Development Projects (special projects) Act No 2 of 1980

National Environmental Act No 47 of 1980 and amendment No 56 of 1988

(to be improved further)

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