THIRD NATIONAL REPORT ON THE IMPLEMENTATION OF THE UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION

BANGLADESH

MINISTRY OF ENVIRONMENT AND FOREST
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH
July 2006

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Abbreviations and Acronyms

ADAB	Association of Development Agencies in Bangladesh
AIC	Agriculture Information Centre
AIS	Agriculture Information Service
APN	Asia Pacific Network
APT	Agricultural Planning Tools
B. Aman	Broadcast Aman
BAEC	Bangladesh Atomic Energy Commission
BAMWSP	Bangladesh Arsenic Mitigation and Water Supply Project
BARC	Bangladesh Agricultural Research Council
BBS	Bangladesh Bureau of Statistics
BCAS	Bangladesh Centre for Advanced Studies
BCSIR	Bangladesh Council for Scientific and Industrial Research
BEMP	Bangladesh Environmental Management Project
BIDS	Bangladesh Institute of Development Studies
BIADP	Barind Integrated Area Development Project
BMD	Bangladesh Meteorological Department
BMDA	Barind Multipurpose Development Authority
BFRI	Bangladesh Forest Research Institute
BRRI	Bangladesh Rice Research Institute
BWDB	Bangladesh Water Development Board
BWFMS	Bangladesh Water and Flood Management
BINA	Bangladesh Institute of Nuclear Agriculture
CBD	National Coordination Body
CBMS	Community Based Monitoring System
CBO	Community Based Organization
CCD	Convention to Combat Desertification
CEPs	Community Empowerment Program
CERP	Coastal Embankment Rehabilitation Project
CHT	Chittagong Hill Tracts
CHTDB	Chittagong Hill Tract Development Board
DAE	Department of Agriculture Extension
DEM	Digital elevation model
DMB	Disaster Management Bureau
DoE	Department of Environment
EAP	Environmental Assessment Program
EIA	Environmental impact assessment
ERD	Economic Relations Division
ESCAP	Economic and Social Commission for Asia and the
FD	Forest Department
FAP	Flood Action Plan
FEJB	Forum of Environmental Journalists in Bangladesh
FFYP	Fifth Five-year Plan
FFS	Farmer-Field Schools
FLIS	Fisheries and Livestock Information Services
FRMP	Forest Resource Management Project
FSP	Forestry Sector Project
FSR	Farming System Research

GEF	Global Environment Facility
GIS	Geographic information systems
GM	Global Mechanism
GSB	Geological Survey of Bangladesh
HPSS	Health and Population Sector Strategy
HRIS	Human Resource Information System
HYV	High Yielding Varieties
ICIMOD	International Centre for Integrated Mountain
ICTPs	International Conventions, Treaties and Protocols
IEG	International Expert Group
IPCC	Inter-governmental Panel on Climate Change
I IPM	Integrated Pest Management
IPNS	Integrated Plant Nutrient System
ISNAR	International Service for National Agriculture Research
JBMP	Jamuna Bridge Multipurpose Project
LGED	Local Government Engineering Department
LGP	Length of Growing Period
Log frame	Logical framework
LRIS	Land Resources Information System
MIS	Management Information System
MoA	Ministry of Agriculture
MoEF	Ministry of Environment and Forests
MoL	Ministry of Land
MoFLS	Ministry of Fisheries and Livestock
MoRDM	Ministry of Relief and Disaster Management
MoWR	Ministry of Water Resources
NAEP	New Agricultural Extension Policy
NAIS	National Agricultural Information System
NAP	National Action Program
NARC	National Agriculture Research Center
NARS	National Agricultural Research System Strategy
NCB	National Coordination Body
NCS	National Conservation Strategy
NEC	National Economic Council
NEMAP	National Environment Mgmt Action Plan
NEP	National Education Policy
NGO	Non Governmental Organization
NWMP	National Water Master Plan
NWP	National Water Plan
PRA	Participatory Rural Appraisal
RAP	Regional Action Program
RBPP	River Bank Protection Project
RIMS	Resource Information Management System
SAARC	South Asia Association of Regional Countries
SACEP	South Asia Cooperative Environment Program
SALT	Sloping Agricultural Land Technology
SDNP	Sustainable Development Networking Program
SRDI	Soil Resources Development Institute
SEMP	Sustainable Environmental Mgmt Program
SOE	State of the Environment

SPARRSO	Space Research and Remote Sensing Organization
SRDI	Soil Resources Development Institute
SWMC	Surface Water Modeling Centre
T. Aman	Transplanted Aman
TNO	Thana Nirbahi Officer
TPN	Thematic Program Network
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
WARPO	Water Resources Planning Organization
WATMANET	Watershed Management Network
WSIP	Water Sector Improvement Project Development

Executive Summary

Bangladesh signed the United Nations Convention to Combat Desertification (UNCCD) on 14 October 1994, ratified the same on 26 January 1996 and it came into force on 26 December 1996.

Bangladesh is a land scarce country with a population of 142 million inhabiting a geographical area of 147,560 sq km, though land is the most important provider of economic and social security for the people of Bangladesh, and agriculture is the most important vocation of its population. The per capita land, particularly for agricultural production has been diminishing with the increase in population; the loss of agricultural land is taking place at the rate of approximately 1 percent per year. Land degradation in varying degrees is affecting about 6.0 million hectares or 43.0 percent of the total land area of Bangladesh. The recent estimate of degraded land points to about 33 percent of the total lands.

Agricultural intensification and the increase in irrigated areas have led to a number of environmental problems, viz. loss of biodiversity through the conversion of forest land into agricultural land and abandonment of many indigenous crop varieties in favor of high yielding varieties (HYVs) leading to irreversible loss of the country's genetic resources. The continuous production of rice is resulting in declining yields and soil nutrient (sulphur and zinc) contents. About 65% of the net cultivable area suffers a shortfall in organic matter contents. Similarly, depletion of organic carbon and total nitrogen were observed in different cropping areas. The increased use of agrochemicals caused pollution of surface and ground water.
Among many environmental issues that Bangladesh faces today, land degradation due to aridity and loss of crops due to droughts has been causing considerable economic losses and human sufferings. It is apprehended that desertification process may have started in some of the most aridity prone areas.

Land degradation in the coastal areas is characterized by water logging and associated productivity decline. Salinization caused by the expanding shrimp farming and sea level rise is affecting a considerable expanse of landmass along the coasts. The coastal belt is also severely affected by the destruction/disappearance of mangroves.

The ecosystem, both flora and fauna are under threat due to loss of habitat. The loss of wetland habitats due to drainage and pumping of water results in the depletion of aquatic fauna and flora and reduction of water availability for the rural population. The current forest protection practices and trends must be reversed, or Bangladesh will not have any significant protected area system left by the year 2010.

The salinity level of the soil in some of the coastal areas has gradually gone up due to the shrinking flow of water along the major rivers with consequent reduction in crop yields. Moreover, due to frequent cyclones, tidal surges, floods etc., there occurs serious deposition of coarse sand along with increasing soil salinity, resulting in severe land degradation in the coastal zones of the country. All these phenomena point to the inevitable fact that a slow but sure process of desertification is in progress in the country. If not checked in time, the exacerbating aridity along with the accompanying desertification process is destined to cause catastrophic situations leading to a severe environmental and socio-economic crisis along the coastal zones of the country.

River erosion is creating tremendous impacts on agriculture and human habitation. The reduced flow in the Ganges river due to flow diversion at Farakka during the dry season has changed the whole hydrological regime with upstream salinity intrusion in the south-western region of the country, degrading the soil and the ecosystem, leading to seriously decreased agricultural production.

Bangladesh comprises the floodplains of the Jamuna, the Padma, the Meghna and some of the smaller rivers. The Madhupur Tract, the Barind Tract, and the Akhaura Terrace stand slightly above the floodplain level and the hills lie along the eastern and the northern boundaries. The western-northwestern part of the country is generally considered as the comparatively drier region marked by lower rainfall.

Very severe spells of droughts hit the country in 1951, 1961, 1975, 1979, 1981, 1982, 1984, and 1989. The past droughts have typically affected about half of the country's area and population. An analysis of the relative effects of flood and drought revealed that drought has been more devastating compared with floods with regard to agricultural production.

Participation of Bangladesh as a party to this Convention will assist the country in resolving many problems related to it.

The estimates of the extent of land degradation in Bangladesh are that over 6.0 million ha falls below the minimum threshold for sustainable cultivation. In drier parts of Bangladesh, low soil fertility is recognized to be at the root of the land degradation spiral leading to desertification. Land degradation in Bangladesh may be considered as temporary or permanent lowering of the productive capacity of land. Evidence of land degradation as shown in satellite imageries indicates a definite change in vegetation cover and soil moisture through the western and south-western regions including the Barind Tract covering Rajshahi, Pabna, western Bogra and southern Dinajpur, largely monocultural area with shrinking wetlands, notably the Chalan Beel wetlands. Human interventions in the densely populated adjoining regions (around the national average of 900 persons per km^2) make these areas more vulnerable. Also, the south-western region of Kushtia and north-western Jessore have also been known to be relatively more prone to aridity.

There are accounts of groundwater table levels going down in dry season in areas in the northwestern region of Bangladesh. This indicates that most of the shallow tube-wells go below the suction lift capacity in the peak irrigation period. The groundwater levels even beneath Dhaka City have been falling steadily over the last twenty-five years as a result of continuous abstraction.

These accounts of lower water table levels, decreasing vegetative cover and decreased agricultural yields indicate disturbing trends of land degradation in many parts of western Bangladesh.

As a result, alternative practices to meet the demands for water, fuel and biomass have emerged, which are deemed to be unsustainable and which necessitates the emergent use of surface water for irrigation, where available.

With a view to undertaking measures for reversing the above trends of land degradation, Bangladesh has considered incorporating several activities as integral components of the national development strategies and environmental planning. The current programmes launched to combat land degradation also include strategies for alleviating poverty because these two goals are complementary. To combat land degradation and to attain sustainable land management and development, current government programmes have focused on field-oriented activities concerted with strengthening institutional capacity that would enable policymakers to make informed decisions on best practices and appropriate mitigation measures. In addition, the GoB wants to build programmes where field level research and community participation is strong to allow application of research results through extension programmes.

Current and completed GoB programmes include (a) afforestation programs on denuded FD lands, and marginal lands controlled by a variety of other government agencies;(b) Barind Integrated Area Development Project (BIADP) (later renamed as Barind Multipurpose Development Authority (BMDA)) under implementation aimed at mitigating the processes of land degradation of the Barind region and (c) soil conservation and watershed management as a component of the current 3-Year Plan.

Some of the longer-term measures proposed and fielded under NEMAP had relevance to combating land degradation, viz. GoB-developed national plans or strategies in combating land degradation, prior to the convention including the National Environment Policy, NEMAP, Bangladesh Forest Policy and the National Water Master Plan (NWMP), which had laid the foundation for promotion of homestead and social forestry, agro-forestry and reforestation of degraded Sal (Tectona grandis) forest regions as well as irrigation facilities to the vulnerable land; Annual afforestation and tree planting programs between MoEF and DAE activities. These afforestation activities were taken up under various schemes and programs of different ministries of the GoB. Under the Forestry Sector Project (FSP), plantation of 40,000 ha of sal forest had been planned during 1997- 2003. Other programs and projects included BIADP and SEMP. Ecosystem Management in the Barind Area was designed to improve the ecosystem of the dry and degraded Barind land through community based sustainable environmental activities. The environment management action plan for Barind Area was aimed at combating desertification and environmental awareness; effecting social mobilization and conducting motivational activities should be ongoing; and the electronic database on agro-ecological and drought prone areas of the country has been created and being managed by the BARC. The CCD Trust Fund has been mobilized through a partnership arrangement with MoEF providing funds to selected activities for implementing NGOs.

The national workshop on the formulation of National Action Programme (NAP) for Combating Desertification held in Dhaka on 2-3 March, 2003 had recommended the following: (a) develop techniques for identification, and ingress of the desertification process using Remote Sensing and other modern techniques, (b) identify regions and areas under stress and select priorities/locations for immediate actions, (c) set up monitoring mechanisms in selected areas, (d) set up early drought warning system using meteorological and hydrological data, (e) synergize with NAPA and NBSAP, (f) undertake activities in priority areas identification of issues, problems and gaps, (g) recommend priority action in the fields of afforestation and reforestation programme with suitable local species, excavation and re-excavation of canals and water bodies for water harvesting and water conservation,

undertake research and pilot level activities in the development of appropriate cropping pattern; introduction of less water demanding and/or drought resistant crops; introduction of salinity resistant crops; prioritize provision of safe drinking water in drought prone areas; improve water management practices; introduce Integrated Water Resource Management practices, research and pilot activities for introduction of renewable energy as well as energy saving devices, improve soil quality though enhancement of organic contents of soil, prevent loss of top soil through integrated crop, land and forest management. Besides the proposals under the above broad heads, the Draft Recommendations made other proposals as follows: (a) integrating NAP with existing policy, plan and institutional regimes; (b) linking up with PRSP; (c) paying attention to regional issues; (d) ensuring participatory approach in NAP formulation and implementation; (e) completion of NAP for presentation at the next COP be held in September 2003 in Cuba; (f) mobilization of funds from GEF and other sources and (g) line Ministries /agencies to carry out all activities under the guidance of the proposed NSC.

Some donor assisted government programs relevant to combat desertification include (a) SEMP, funded by UNDP as the follow-up implementation of National Environment Management Action Plan (NEMAP), addresses the major environmental priorities identified by people through NEMAP; (b) Forest Resource Management Project (FRMP); (c) Bangladesh Environmental Management Project
(BEMP), CIDA-funded institutional strengthening project to assist the DoE in meeting its mandate as defined in the ECA 1997; (d) Water Sector Improvement Project (WSIP); (e) Follow-up on River Bank Protection Project (RBPP); (f) Bangladesh Arsenic Mitigation and Water Supply Project (BAMWSP); (g) Coastal and Wetland Biodiversity Management at Cox's Bazaar and Hakaluki Haor funded by GEF; (h) National Biodiversity Strategies and Action Plan (NBSAP) and (i) National Environmental Action Plan (NEAP) for Barind Areas.

The activities undertaken of late include (a) Bangladesh has prepared the National Action Programme (NAP) for Implementation of the UNCCD in Bangladesh The draft NAP was completed in April 2005 through a consultation process with 22 stakeholders that included three land related disciplines from two universities, four land related and agricultural research organizations, nine government departments, and three ministries of the Government. In addition the civil society was represented by major NGOs. The NAP has identified eight thematic areas for programme elaboration that included awareness raising, capacity building, institutional strengthening and cooperation, rehabilitation of degraded land and strategies for land degradation mitigation, integrating options for poverty alleviation. The NAP now awaits Government approval before implementation, (b) the Forest Department with the financial support from the Asian Development Bank has undertaken the Forestry Sector Project (FSP) for sustainable management of forest through community participation, and promotion of measures that include social forestry and agro-forestry to enhance forest resources while arresting degradation of forestland. The project covers all the 64 districts and involves 29 of the 43 Territorial and Social Forest Divisions of the country, (c) The Government also initiated a new institutional focus as the Nishorgo Programme in February 2004 to continue till 2010 for conservation of the protected areas. A management team of the Forest Department should become established as a recognized institution of excellence for participatory management of the protected areas involving the local population and their culture. The Arannyak Foundation, that has been established by the joint initiative of the Government with support from the United States will play a catalytic role in the realization of the vision of the protected area management outlined in this project providing financial and technical support, and by building people's awareness towards this vision,(d) the MOEF has established a clearinghouse for the UNCCD within the ministry to follow up on the

Convention that also includes the preparation of national reports and (e) Bangladesh is in the process of establishing effective participation and linkages in the regional and sub-regional programs under UNCCD and the Thematic Program Network (TPN) for cooperation between affected countries.

1. Background Information

Bangladesh signed the United Nations Convention to Combat Desertification (UNCCD) on 14 October 1994, ratified the same on 26 January 1996 and it came into force on 26 December 1996.

1.1 Physical Environment

Bangladesh has a land area of about 147,570 sq. km (BBS). About 80% of the country comprises floodplains of the Jamuna, the Padma, the Meghna and a number of smaller rivers together with the estuarine and the tidal floodplains. The Madhupur Tract, the Barind Tract, and the Akhaura Terrace stand slightly above floodplain level, occupying about 8% of the total area. Hills occupy about 12% and lie to the East and the North. Some hill terrace regions include significant proportion of valley land. Much of Bangladesh is still going through active land building. The dynamic process includes tidal flats, delta front and accompanying channel shifting.

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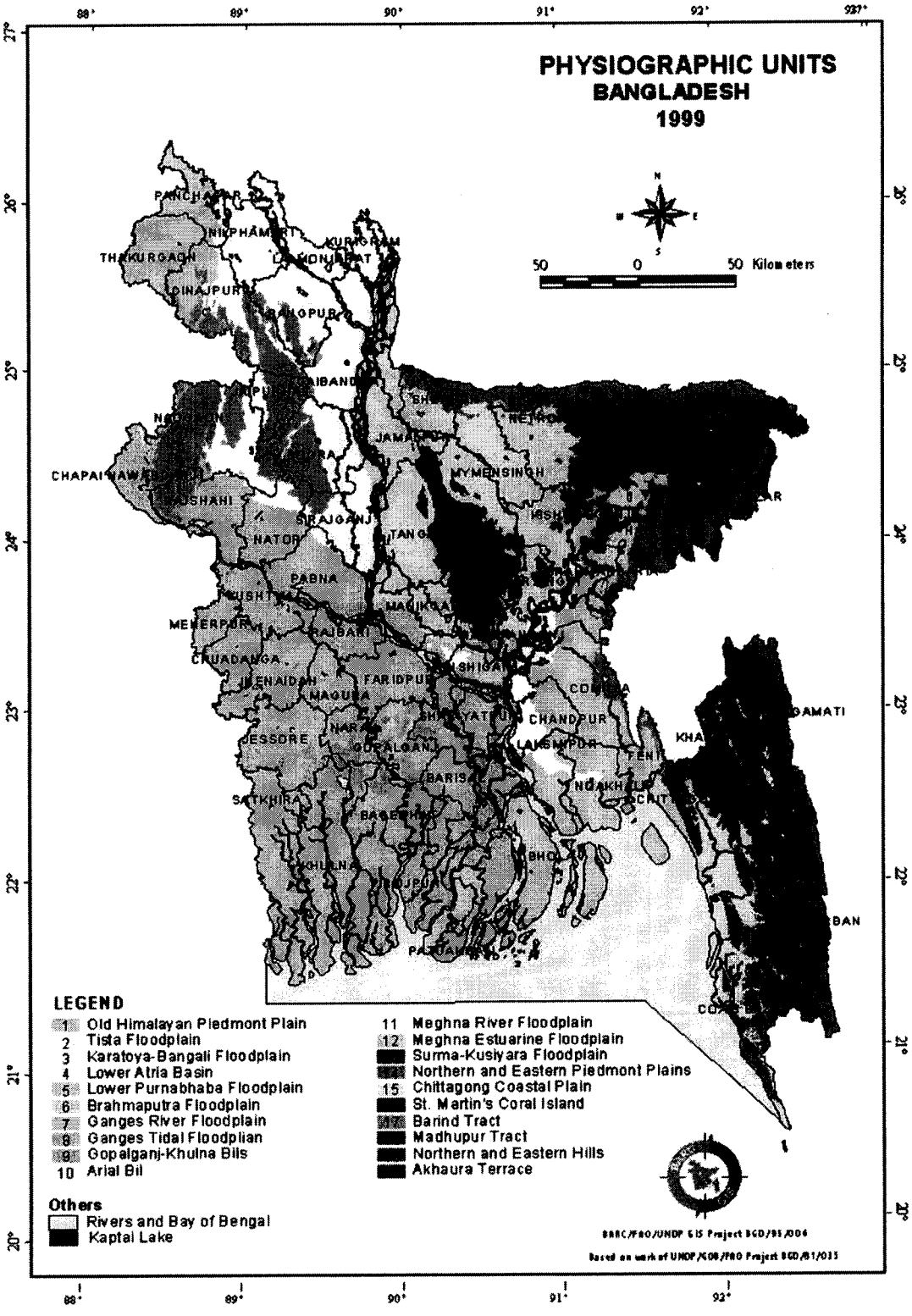
PHYSIOGRAPHIC UNITS
BANGLADESH
1999
50 0 50 Kilometers
LEGEND
1 Old Himalayan Piedmont Plain
2 Tista Floodplain
3 Karatoya-Bangali Floodplain
4 Lower Atria Basin
5 Lower Purnabhaba Floodplain
6 Brahmaputra Floodplain
7 Ganges River Floodplain
8 Ganges Tidal Floodplian
9 Gopalganj-Khulna Bils
10 Arial Bil
11 Meghna River Floodplain
12 Meghna Estuarine Floodplain
Surma-Kusiyara Floodplain
Northern and Eastern Piedmont Plains
15 Chittagong Coastal Plain
St. Martin's Coral Island
17 Barind Tract
Madhupur Tract
Northern and Eastern Hills
Akhaura Terrace
Others
Rivers and Bay of Bengal
Kaptai Lake
BARC/FAO/UNDP GIS Project BGD/91/004
Based on work of UNDP/FAO/FAO Project BGD/81/033

1.1.1 Land Resources

There is a great diversity of soil. Typically floodplain regions have a close pattern of permeable, loamy soils low in organic matter on the highest parts, grading into impermeable clays with moderate or high organic matter contents in adjoining depressions.

In hill regions, alternating beds of little-consolidated sands and shales provide complex mixtures of deep and shallow soils. Hill soils are located in the south and southeast of the country, and are often located on tracts susceptible to erosion and difficult to irrigate.
The physiographic units of Bangladesh are delineated in the map given below.

1.1.2 Climate

The country has sub-tropical monsoon climate. The average temperature ranges from 7^0C to 13^0C during winter and 24 to 31^0C during summer. The average annual rainfall varies from 1200 to 4300 mm (WARPO, 2000). The recent trends show that the country experiences about an eight-month dry period which is on the verge of aridity heading towards desertification.

1.2 Delineating Dry Regions of Bangladesh

Attempts were made to identify the aridity in Bangladesh using meteorological data. It was observed that Bangladesh does not fall within the annual aridity limit of 20 according to Martonne Indices. However, if the monthly data were used seasonal aridity could be observed (Jabbar, 1990). The seasonal aridity increases from 4 months (November-February) in the northeast/ southeast regions to 6 months (November-April) in the northwest region. WARPO advocates dry month periods of 7- month duration (November - May).

On the basis of annual rainfall frequency of rainfall (25mm, 50 mm), maximum, minimum and frequency of temperature (25^0C, 30^0C and 35^0C), clear days, cloudy sky and first available rain of the season, Bangladesh has been divided into 7 seven agro climatic zones (FAO/UNDP/BRAC 1988). Out of these, the zones E, F and G possibly be considered as relatively dry zones. These would be part of the agro ecological zones of the Barind and Madhupur Tract and the Ganges Floodplains.

1.3 Droughts in Bangladesh

Bangladesh is a drought prone country. In recent years, Bangladesh has been experiencing droughts almost annually. Although droughts are not always continuous in any area, they do occur sometimes in the low rainfall zones of the country. Droughts occur sometimes even during the wet season as well as in winter.
Two critical dry periods within a year are distinguished (Karim et al., 1990). Rabi and pre-Kharif drought (January - May), due to:

(i) the cumulative effect of dry days;
(ii) higher temperatures during pre-Kharif (> 40 degrees Celsius in March-May); and
(iii) low soil moisture availability.

This drought affects all the Rabi crops, such as HYV Boro, wheat, pulses and potatoes especially where irrigation possibilities are limited. It also affects sugarcane production. Kharif drought in the period June/July to October is created by sub-humid and dry conditions in the highland and medium highland areas of the country (in addition to the

west/northwest, also the Madhupur tract is drought prone). Shortage of rainfall affects the critical reproductive stages of transplanted Aman crops in October-December, reducing its yield, particularly in those areas with low soil moisture holding capacity.
Considering the Agro Ecological Zones (AEZ) database and land resources inventory map at 1:1,000,000 scale, BARC has identified and mapped drought prone areas of Bangladesh for Rabi and Pre-Kharif seasons (WARPO- EGIS, 1996). Recently BARC has reviewed this concept and produced three different maps for Rabi, Pre-Kharif and Kharif seasons (BARC, 2001). The drought severity classes defined in the maps are slight, Moderate, severe and Very severe related to the yield losses of 15-20%, 20-35%, 35-45%, and 45-70% respectively for different crops (Karim and Iqbal, 2001).

Summary of Drought Severity Areas in Bangladesh by Crop Season (in M ha)

Drought Class	Rabi	Pre-Kharif	Kharif
Very Severe	0.446	0.403	0.344
Severe	1.71	1.15	0.74
Moderate	2.95	4.76	3.17
Slight	4.21	4.09	2.90
No Drought	3.17	2.09	0.68
Non-T.Aman			4.71

Karim and Iqbal, 2001.

The northwestern part is prone to drought mainly because of rainfall variability in the pre-monsoon and the post-monsoon periods. Inadequate pre-monsoon showers, a delay in the onset of the rainy season or an early departure of the monsoon may create drought conditions in Bangladesh, and adversely affect crop output.

1.3.1 Mitigation of Drought

Since land is being over used and degraded due to pressure of population, effective population control, judicious land use and sustainable agricultural practices are urgently required to mitigate droughts.
CEGIS/BARC/BRRI has developed an operational model to assess and manage the timely water requirement under different climatic conditions with an objective to produce maximum yields with optimal water use.
The problem of land degradation may be studied to develop sustainable land use. Attempts are being taken to establish a database for periodic monitoring and determining necessary actions.

1.4 The Process of Land Degradation

The driving forces and pressures, state, and impact related to land degradation, and responses to address the problems (GOB-BCAS- SACEP- NORAD- UNEP, 2001) are:

(i) Improper Cultivation in Terrace Land, Floodplains and Piedmont Plains;
(ii) Faulty Irrigation;
(iii) Imbalanced Fertilizer Use;
(iv) Plough pan;
(v) Improper Use or Pesticides;

(vi) Over Exploitation of Biomass from Agricultural Fields;
(vii) Unplanned Rural Infrastructure; (Road Embankment, FCDIs)
(viii) Salinization;
(ix) Brickfields and Biomass;
(x) Unplanned Industrial Development;
(xi) Mining of Sand and Gravels from Agricultural Land;
(xii) Land Ownership and Tenure;
(xiii) River Bank Erosion and Sedimentation;
(xiv) Sandy Over-wash on Agricultural Land; and
(xv) Salinity.

Much of the land degradation is human induced through destruction of forest and vegetation cover and due to farm activities in sloping and undulated terrains. Other forms of land degradation, however, viz. Stalinization and aridity also occur due to climate change and withdrawal of water upstream from the Transboundary Rivers. Drastic reduction of dry season flow in the Ganges river has accentuated land degradation in the northwest and southwest region. Salinity intrusion has degraded soil and ecosystem, leading to decreased agricultural production and increased poverty (World Bank, 2000a).

The groundwater table goes below 9 m to 20 m in dry season in various regions of the country. It indicates that most of the shallow tubewell goes below the suction lift capacity in the peak irrigation period.

1.4.2 Degradation of Soil Fertility

Soil fertility decline has occurred due to removal of nutrients as well as uneven fertilizer application without accounting for soil characteristics. The degradation results in a gradual decrease of soil quality.

River erosion is posing threats for both sustainability of agricultural and human habitation in Bangladesh. Population increase puts pressure on non-crop ecosystems such as forests and wetlands to convert them to croplands.

Soil infertility, especially plant nutrients deficiency also occurs because of unbalanced use of chemical fertilizers and pesticides for higher yields. The vulnerable areas include the greater districts of Rajshahi, Kushtia, northwestern Jessore, Pabna, western Bogra and southern Dinajpur. The area includes the largely monocultural Barind Tract, the fast shrinking (due to human intervention) Chalan Beel wetlands, and densely populated adjoining regions.

Intensive acidification is also identified in the heavy clays in the Lower Atrai Basin and in some broad valleys within the Barind and Madhupur area (Dowlah, 1998). Some areas are affected by wind erosion mainly in the district of Rajshahi and Dinajpur during the drier months of the year. Most of the topsoil in the cultivated/ deforested areas of the terraces, and floodplains are acidified to a variable extent.

1.4.2 Extent of Land Degradation in Bangladesh

An assessment has been made in terms of production loss of crops, and additional agricultural input necessary to maintain soil nutrients. It was found that total economic cost of land degradation exceeded 2000 million US$ per year as presented in the following table (GOB-BCAS-SACEP- NORAD- UNEP, 2001). The current situation may have worsened.

Extent of Land Degradation in Bangladesh

Types of land degradation	Total area (M ha)	Dry region (M ha)
Water erosion	1.7	0.10
Bank Erosion	1.7	0.10
Soil Fertility Decline	8.0	1.84
P deficient (for HYV rice)	8.5	5.89
P deficient (for upland crops)	5.6	0.95
K deficient (for HYV rice)	7.4	4.82
K deficient (for upland crops)	7.5	0.95
S deficient (for HYV rice)	7.7	2.86
S deficient (for upland crops)	8.7	
Soil organic matter depletion	7.5	2.9
Water logging	0.7	
Salinization	3.05	
Pan formation	0.06	
Acidification	0.6	
Deforestation	1.5	0.10

Source: BARC, 1999; SOE, 2001; Chowdhury, 1995; Karim and Iqbal, 2001

2.85 million ha play a very important role in the overall economy of the country owing to its rich natural resources and resource potential. But these natural resources are being depleted rapidly as a consequence of land degradation among other factors.

1.5 The Effects of Climatic Change

The possible physical effects of global warming and climate change pose two-pronged threat to Bangladesh, viz.sea level rise leading to more severe flooding in the southern half and exacerbated drought and aridity in the northern half of the country.

1.6 Desertification Process in Bangladesh

Though Bangladesh is predominantly a riverine country, northwestern region is threatened by desertification. The ratio of cultivable land to rural population (acre/ person) has decreased in the northwestern region (Rajshahi Division) by 23.2% as compared to a decreased ratio of 17.2% in the whole of the country (GOB-World Bank, 2000). Some geographers and ecologists claims that there is evidence of desertification from the very dry soil conditions in the Barind Tract region and the white reflectance of the soil surface on air photos and satellite imageries (Jabbar et al., 1982).

Landsat imagery of the Barind Tract have been interpreted as a pronounced change in vegetation cover and soil moisture. This change has been attributed to a desert-like condition prevailing during the dry season.

The Farakka Barrage has restricted fresh water flows during the dry season and caused serious problems in southwest of Bangladesh. The diversion of Ganges water by the Farakka barrage in India has contributed to the reduction of surface water availability and aggravated

the desertification process in the western part of the country. The decreased stream flow also affects river morphology, salinity, ecosystem, etc.

1.6.1 Major Causes of Desertification/ Land Degradation in Bangladesh

Increasing human population in the dry regions is one of human ecology. Mismanagement of resources has been a prime source of desertification, which is accelerating in many areas. Erratic rainfall results in widely fluctuating production leading to scarcity, which imposes stress on these populations. As population increases, the demand on natural resources is further magnified. The consequence is an imbalance between the human and animal population, on the one hand, and plants, water, and land resources on the other. About 2.3 million ha is estimated to be prone to severe drought.

The gradual increase of fuel demand and economic depression of the region accelerated rapid destruction of forests/ plants, which resulted in giving rise to environmental imbalance in nature. Inadequate rainfall year after year and depletion of vegetation have jointly brought about inevitable onslaught of arid environment.

In the coastal regions, major causes of land degradation are riverbank erosion, salinity intrusion, deposition of coarse sand by tidal surge, cyclones and storm surges.

1.6.2 Extent and Impact of Desertification / land Degradation in Bangladesh

More than 6 million ha of the total geographical area is affected by various forms and degree of degradation. More than one-fourth of the total cultivable land is affected by drought in every year with different intensity. The recovery of such land depends upon its resilience, which, however, may be lost completely if the land is not treated in time with care. Frequent droughts, through its short-lived but recurrent stress, can aggravate the adverse impact and, if not checked properly, can interfere with the natural capacity of land to recover and advance the process of desertification.

Agricultural intensification and the increase in irrigated area have led to a number of environmental problems i.e., loss of bio-diversity through the conversion of forest land into agricultural land; abandonment of many indigenous crop varieties in favor of HYV 's leading to irreversible loss of the country's genetic resources; depletion of soil nutrients and organic matter due to intensive cropping; and deprivation of soil from organic content due to use of crop residue as fuel. Other environmental degradation includes loss of wetland habitats through abstraction and drainage resulting in depletion of aquatic fauna and flora and reduction in water availability to the rural population.

Adverse conditions resulting from desertification process are:

(i) deterioration of the natural resources adversely affecting the socio-economic condition and livelihood support systems;
(ii) reduction of irrigation potential;
(iii) diminishing of the food security base of human beings and livestock;
(iv) scarcity of drinking water extraction and depletion of ground water, interference with spacing of tube well, including hand tube well, shallow and deep tube well;
(v) health and nutrition status of the population, arsenic contamination in ground water, contamination due to disposal of waste and inadequate sanitation;
(vi) reduced availability of biomass for fuel;
(vii) loss of bio-diversity; and

(viii) Impoverishment, indebtedness and distress sale of assets of production.

1.6.3 Options and Measures Needed to Combat Land Degradation/ Desertification

It is clear that the quality of land has deteriorated, and its impacts are visible. Over the last decade, crop yield has declined due to deterioration of physical and chemical properties of land and soil. It would be useful to establish a baseline survey on which future monitoring and assessment or further deterioration or improvement could be based.
In the event of drought the Government undertakes relief measures by providing drinking water, food grains fodder, food subsidies to special groups and employment through food-for-work-programme. The Disaster Management Bureau coordinates drought relief works with local governments. The activities of the Bureau also comprise human resource development, research case studies, database and information services, and documentation on disaster management. Rural Works programme of the GOB provides employment to the population affected by drought and helps to mitigate the severity of the drought wherever it may occur.

1.7 Economy

Bangladesh's population is approximately 140 million. Bangladesh economy has grown around 6% p.a. in recent years. Inflation has been moderate till recently. Foreign reserves are comfortable while domestic resources now finance 50% or so of the development expenditures. The country has a per capita GDP of about US$ 450/ year. Around 45% of the population are poor with the extreme poor accounting for nearly 20%. Natural shocks such as drought are a major threat to the livelihood of this group as well as the national economy.

2. Methodology

Taking the Bangladesh Second National Report as baseline, and following the UNCCD prescribed Help Guide, a national team of experts (Mr. Mahiuddin Ahmed, Dr. Rezaul Karim, Mr. Mir Waliuzzaman) prepared the Third National Report through reviewing the Second National Report and incorporating the updated information gathered from various relevant sectors/organizations including NGOs and IUCN Bangladesh. The draft report was finalized through holding a national consultative workshop participated by all concerned stakeholders and representatives of all the relevant sectors. The draft report was shared with the workshop participants and further necessary information was obtained from them and duly incorporated duly in finalising the said report.

3. The Strategies and Priorities within Sustainable Development Policy Framework

The Government is concerned about environmental issues in general and land degradation in particular over the past two decades. The major policy initiatives, strategies and plans emphasized environment and natural resource management, land management, and forest development with a view to achieving sustainability in resource conservation and utilization. These policies and strategies have relevance to measures to be taken to combat land degradation occurring in the drier zones as well as the coastal areas of Bangladesh.

3.1 National Plans and Strategies in Other Social and Economic Areas

The national plans and strategies, which cover the general social and economic areas, are also relevant in the context of community development, uplift and rehabilitation in the dry region of the country.

3.1.1 Planning for Development

The national planning process is guided by the National Economic Council (NEC), which is headed by the Prime Minister. The former 5-year plan periods ceased and subsequently, 3-year planning periods were introduced, which is also not in practice now. The country's major planning focus currently is centered around the PRSPs, which reflect the global MDGs, that address the policy thrust and key elements of growth and conservation strategy in development process as expected to prevent land degradation and improve the capacity for sustainable development in the vulnerable areas.

3.1.2 The Master Plan for Forestry

The Master Plan for Forestry Sector (ADB-UNDP-GOB, 1996) was prepared in 1996 and has since been under implementation with major focus on protection of land against degradation by soil erosion, floods, landslides, desertification and other effects of ecological imbalance. Soil conservation and watershed management is one of the major components of the Plan.

3.1.3 National Environment Action Plan (NEMAP)

The National Environment Management Action Plan (NEMAP) formulated in 1995 has been the major policy document used by the Government for undertaking environmental activities in the country and hence fulfils the need for addressing the UNCCD mandates in the country too. The government's strategy now recognizes the inseparable links between environmental degradation, poverty, and population growth and the implications for natural resource management. Presently, the implementation of NEMAP is ongoing under the UNDP-funded programme SEMP.

3.1.4 Agenda 21 Implementation Plan

In the year 2002, on behalf of the GoB, IUCN Bangladesh conducted a Rio+ 10 assessment of the activities pursued in Bangladesh towards the implementation of Agenda 21 with assistance from the Earth Council, Costa Rica. Bangladesh country report presented in Johannesburg in 2002 had also focused on the same.

3.2 National Strategies to Combat Desertification Prior to UNCCD

Nothing appreciable had happened in this sector in the period preceding 1992, excepting the facts that the Ministry of Agriculture had a drought monitoring cell established then and irrigation had been introduced much before that timeline, that is, since the 1970s.

3.3 Strategies and Priorities Developed After the UNCCD

Bangladesh has prepared its National Action Programme (NAP) for combating land degradation/desertification towards the implementation of the UNCCD in a comprehensive manner. As per recommendations of the finalized National Land Use Policy, the Ministry of Land (MoL) will undertake a detailed land zoning countrywide to protect land resource against degradation and to ensure sustainable use of land resources.

Under the UNFCCC, NAPA has been formulated in November 2005 in a bid to devise means of adaptation to climate change vulnerabilities relevant to combating land degradation/desertification. Meanwhile, Bangladesh has formulated its National Biodiversity Strategy and Action Plan. This plan has been envisaged to be building a unifying framework for guiding and coordinating various biodiversity related programs and projects under implementation at design stage, through identifying the national priorities. It will reflect national aspirations and build on existing national strategies and plans.

WARPO has prepared an integrated coastal zone management plan (ICZMP). There are 24 priority investment projects identified in the said plan, of which detailed coastal land zoning is an important one.

Under the SEMP in the Barind region, Barind Environmental Action Plan (BEAP) has been formulated so as to address widespread land degradation in the Tract.

3.4 Afforestation Programs

With regards to the number of FD projects to be implemented, the MoEF approves the afforestation and social forestry programs proposed by the FD. The GoB had imposed a moratorium on tree felling in 1989 to encourage forest conservation which still holds good. Further activities include attempts by the GoB to increase by 10% the amount of protected areas in reserved forest lands by 2015.

3.5 Other Programs and Projects

3.5.1 Barind Multipurpose Development Authority (BMDA)

As an important component of SEMP, an activity titled "Ecosystem management in the Barind area" was designed to improve the ecosystem of the dry and degraded Barind tract through community based sustainable environmental activities. Under the said component, BMDA has formulated an Action Plan entitled Barind Environment Management Action Plan (BEAP). The main objectives of the plan are sustainable environment management in the Barind area. The major activities of BEAP include: surface water conservation and management, community based beel (water body) management, soil conservation, rain water harvesting, large scale afforestation, control of soil erosion, alternative income generating activities, environmental awareness; social mobilization and motivational activities.

3.5.2 Sustainable Environment Management Programme (SEMP)

SEMP Phase-II is expected to be launched in a couple of months' time. The main focus of the SEMP activities will now be on Environmental Governance.

3.5.3 Protected Areas

Bangladesh has 18 protected areas (1.6 per cent of total area) of which three were added after 2002. Bangladesh also boasts 5 Eco-parks (7614 ha). Under the Bangladesh Environment Conservation Act, management and operationalisation of the erstwhile designated 8 ecologically critical areas (ECAs) for protecting the natural resources and biodiversity are being effected to forestall their further deterioration.

3.5.4 Forestry Sector Project

The project activities have resulted in enhancing green cover, soil quality, biomass, livelihood, watershed management and helped substantially in combating land degradation as the project has been successfully accomplished.

3.5.5 Coastal Green Belt Project

The Coastal Green Belt Project has been successfully implemented by the FD. Under the project, the coastal belt has been considerably fortified against erosion, natural calamities etc as the plantations raised have proved to be useful as envisaged.

3.5.6 Bangladesh Environmental Management Project (BEMP)

BEMP first phase has been completed in June, 2006 and the aim of the project was, among others, to build institutional capacity for sustainable environment management in the country.

The Second Phase of this project has been named as Bangladesh Environmental Institutional Strengthening Project.

3.5.7 Coastal and Wetland Biodiversity Management in Cox's Bazaar and Hakaluki Haor (CWBMP)

After 2002, Bangladesh has demonstrated increased determination and commitment to address the challenges of ensuring sustainable use and conservation of its natural resources, including its biodiversity. A number of specific policies, laws, action plans and strategies have been drafted in this regard. The above activities are ongoing as planned and envisaged to be successfully completed by 2009. Conservation and sustainable management of this great ecosystem should enhance the local aptitude in managing watershed, conservation of biodiversity, restoration of habitat and water recharge of the surrounding uplands.

3.6 Energy for Rural Communities

Bangladesh has undertaken the implementation of a project titled 'Improving kiln efficiency in brick-making industry'. Adoption of energy efficient kilns should lead to a decline in the emissions of pollutants and markedly improve the profitability of the Small and Medium Enterprises (SMEs).

LGED under a SEMP component has undertaken a number of activities including dissemination and demonstration of community based rural energy development as a replacement of fossil fuel, installation of solar photo voltaic (PV) systems for providing electricity to remote rural households and community based bio-gas plants for providing more efficient and demonstration of environment friendly cooking facilities for rural people for replication. A total of 1,00,000 rural households have been connected to this service to date. About 25,000 units of biogas plants have so far been installed with good potential of generating electricity using poultry wastes and rice husk.

Assessment of wind energy resource mapping has been done at 20 locations and monitoring is ongoing. LGED also installed wind energy capture devices for electricity generation in the coastal areas of the country.

UBINIG, a policy research NGO has been pursuing biodiversity based ecological agriculture, popularly known as 'Nayakrishi' (novel agriculture) movement for over two decades. Included in its innovative use package is the promotion of surface water for irrigation instead of extracting groundwater.

3.7 Indigenous Knowledge and Practices towards Combating Land Degradation and Drought

The GoB has undertaken the task of recording, collecting and building an archive on our rich traditional and folk knowledge and practices with the examples of best use relevant to conservation and sustainable management of natural resources with a view to utilizing and mainstreaming them through their replication countrywide, as appropriate. Also, a number of development projects have been undertaken in the remote areas to involve the tribal as well as other groups of detached and marginalised people in the national development processes. For example, participatory resource management in the CHTs, a SEMP component and project activities of the Arannyak Foundation in the tribal areas under USAID funding may be cited as a few of such interventions.

Another example of upholding the proven age-old traditional practices including their replication in different areas of Bangladesh is UBINIG's efforts directed towards restoration of thousands of lost rice germ plasm, building a comprehensive seed store, introduction and use of indigenous fertilization and pest control etc.

3.8 Policies

The major relevant policies are as follows:

National Environment Policy, 1992. (NEP)
National Water Policy, 1999
National Land Use Policy, 2001
National Forest Policy, 1994
National Agriculture Policy, 1999
Coastal Zone Policy, 2005
Arsenic Mitigation Policy, 2004
National Livestock Policy, 1992
Disaster management Policy (under review)
The Wetland Policy (Draft)
National Environment Management Action Plan 1992
National Biodiversity Strategy and Action Plan 2005

4.0 Institutional Measures for Implementing the Convention

4.1 National Coordination Body (NCB)

An NCB has been formed with the appropriate paraphernalia for coordinating all matters on the environment and is responsible for providing and environmental policy framework, monitor, evaluate and co-ordinate its implementation along with the implementation of UNCCD. The Secretary Ministry of Environment and is the national Focal point of the convention.

4.2 National Action Program (NAP)

Bangladesh has already prepared the NAP for Implementation of the UNCCD in Bangladesh The draft NAP was completed in April 2005 through a consultation process with 22

stakeholders that included three land related disciplines from two universities, four land related and agricultural research organizations, nine government departments, and three ministries of the Government. In addition the civil society was represented by major NGOs. The NAP has identified eight thematic areas for programme elaboration that included awareness raising, capacity building, institutional strengthening and cooperation, rehabilitation of degraded land and strategies for land degradation mitigation, integrating options for poverty alleviation. The NAP is undergoing necessary process of being approved by the Government now. The leitmotifs of the NAP would be centered around (1) understanding the desertification scenario; (2) promotion of awareness and capacity building; (3) institutional arrangements; (4) reclamation and rehabilitation of degraded land to promote sustainable utilizations of land resources (5) land degradation/desertification mitigation and poverty alleviation strategies; (6) promotion of active participation of communities in land management programmes; (7) judicious location of construction sites and physical infrastructure and (8) research and technology development.

4.3 Data Banks

National water resource database has been developed by WARPO, Bangladesh. Currently, integral coastal resource data base (ICRD) has been developed and integrated with National Water Resource Data base. There are more than 300 GIS lays with attributed information on demography, physiography, landuse, water resource, hydrological and infrastructure upto upazila level. The Department of Environment (DoE) is also developing environmental database and information system (including setting up a metadata base, which as a coordinated national repository of information on environment and development in all sectors, would be very much relevant for the requirements of UNCCD) on various aspects of environment and management practices, which could be used to address the requirement of UNCCD amongst others. Bangladesh Agricultural Research Council (BARC) has electronic database on agro-ecological and drought prone areas of the country. The Land Resources Information System (LRIS) includes additional databases and procedures, in particular data on socioeconomic and demographic factors influencing agricultural production. Meteorological station data is analyzed at BARC using the Agricultural Planning Tools (APT) calculator, and the resulting data is then used to create GIS surfaces showing important climatic properties related to plant growth by season as well as the variability of these properties. The Forest Department's RIMS-GIS unit has been further strengthened through the development of a Central DataBase on forest resource assessment of individual forest types.

4.4 Strengthening Facilities for Monitoring and Evaluation of Desertification

The Soil Resources Development Institute (SRDI) has finalized a plan for conducting research on land degradation, land productivity, soil conservation and water management and prepared salinity and land use maps. Moreover, this plan also includes monitoring of soil fertility, land use and land management. The CDMP has formulated a national disaster management policy, disaster management act and devised an updated and effective disaster early warning system. CEGIS is continuously updating various maps on land degradation using GIS and SPARRSO also is engaged in preparing satellite imagery on ecosystems focusing on land degradation.
An Integrated Coastal Resources Database (ICRD) is being developed containing multi-sectoral information on the coastal zone, as described in the Coastal Zone Policy 2005.

4.5 Promotion of Research on Desertification and Management of the Effects of Drought

The BRRI scientists have recently developed a salinity resistant rice variety especially suitable for the coastal degraded land. The CDMP has devised an updated and effective natural calamity early warning system. Moreover, the government has established a Disaster Management Information Centre (DMIC) for operating a data bank on disaster management.

4.6 Functional Legal and Regulatory Framework

Environmental law governs the inter relationship between natural resources and other living organisms. The national legislations can be categorized to cover sectors and issues like pollution and conservation, land use and administration, agriculture and agro-chemical, water resources, fisheries, forestry and others. The contents and objects of the national environmental laws suggest that they were enacted to address mainly two aspects of environmental conservation i.e. resources management and pollution control. Recently, the CDMP has formulated a disaster management act. WARPO has formulated a national water code.

5. Participatory Process for Preparation and Implementation of the Action Program

5.1 Representation of Various Actors in the National Priorities Identification Processes

The national workshop for preparing NAP organized by Bangladesh on 2-3 March, 2003 was participated by all the stakeholders, concerned sectors, educational institutions, research organizations, NGOs, Cobs etc. The priority areas and actions were identified in consultation with the participants. Subsequently, the draft NAP was prepared incorporating the same findings and recommendations. Again, after the draft NAP was prepared, series of similar consultations were organized with the stakeholders.

6. The Consultative Process in Support of the Preparation and Implementation of the NAP

Through a series of consultations held countrywide, the GoB has successfully prepared the NAP document, fulfilling all the obligations and requirements under the UNCCD and it now awaits formal approval by the Government.

7. Measures Taken/ Planned to Enhance Knowledge on Desertification

BRAC University has introduced a course on disaster management offering masters diploma. Under CDMP, an early warning system has been upgraded under the disaster management policy.

7.1 Adequate Diagnosis of Past Experiences

7.1.1 Synthesis and Evaluation of Activities Undertaken in the Field of Combating Desertification and Mitigating Drought

Issues of land degradation, particularly soil erosion and watershed, and soil fertility conditions, were identified during the preparation of the Master Plan for Forestry Sector in 1995 and NEMAP in 1995. Since then, a number of studies have been conducted and information updated as part of the planning process.
Experiences gained in soil and water conservation, and forest management and conservation of agricultural land, demand the launching land improvement programs with people's participation. There is also a need for involving the local people for community development works. The Ministry of Environment and Forests has been supporting few activities through the BMDA project under SEMP with broad-based programs in a bid to address the obligations with regard to the implementation of the UNCCD. The research and action programme has been envisaged to provide a comprehensive picture of the state of desertification and drought problems in Bangladesh, which has been achieved to a considerable extent and interventions fielded already as an attempt to mitigate the perceived environmental imbalances, with a view to sounding sustainable natural resource management modes and identifying priorities for a national plan of action, which also, meanwhile, has been chalked out. Activities included the planning, implementation and operational elements including awareness raising, training and capacity building, communication and participatory processes, emergency preparedness etc. relevant to the UNCCD.

In addition, a large number of NGO initiated projects have been under implementation over the past years, which have strong relevance to the UNCCD mandates. These include, among others, social and community forestry project, awareness raising, community level participatory natural resource conservation.

7.1.2 Experience from the National Work shop for preparing NAP

The experience of successfully holding the National Workshop on Formulation of National Action Programme (NAP) for Combating Desertification held in Dhaka on 2-3 March, 2003 enhanced, beyond doubt, the national capacity for identifying the priorities and culling options for addressing the same with regard to UNCCD mandates

7.2 Established Technical Programs and Functional Projects to Combat Desertification

The following interventions may be named under the above description:

7.2.1 The Barind Multipurpose Development Authority (BMDA):

To retain the environmental balance and to check the desertification of the Barind region, the government in 1985 had undertaken the implementation of the Barind Integrated Area Development Project (BIADP), which was later renamed as Barind Multipurpose Development Authority (BMDA) covering areas in Rajshahi, Naogaon and Nawabganj districts. Before the project activities started in the region, Barind Tract was the most unfavorable agricultural section of the country with rain fed local T. Aman as the dominant crop. The ensured supply of deep tubewell (DTW) irrigation has fundamentally changed the agricultural scenario in the Barind. In place of single crop, now multiple crops are grown with higher agro-economic productivity. This transformation to multiple cropping has resulted in productive cropping patterns and increased cropping intensities. Construction of cross-dams,

water control structures, re-excavation of canals and ponds have contributed to improve surface water augmentation. This is reflected in satisfactory command area development, ecological balance and pisciculture. Due to the lack of good road network, the slow moving bullock cart was the main transport used for carrying goods and passengers. Construction of feeder and rural roads has changed the status of rural livelihood through uplift of rural economy by BMDA.

7.2.2 Linkage of Land Degradation to Energy

The Energy Perspective Plan has established a linkage between the process of land degradation and energy consumption pattern, particularly the biomass fuel. This plan emphasizes the need for switching over the use of biomass fuel to clean energy, which is likely to contribute to increase the green cover and minimize the loss of nutrient rich soil.

7.2.3 Measures Taken to Mitigate the Effects of Drought

In the event of drought, the Government undertakes relief measures by providing drinking water, food grains fodder, food subsidies to special groups and employment through food-for-work program. The Disaster Management Bureau coordinates drought relief works with local governments. The activities of the Bureau also comprise human resource development, research case studies, database and information services, and documentation on disaster management. Rural Works program of the GOB provides employment to the population affected by drought and helps to mitigate the severity of the drought wherever it may occur.

7.2.4 Drought Assessment framework (DRAS)

CEGIS has developed DRAS for quick assessment of water scarcity and irrigation management in any part of the country. At present, DRAS model validation work is going on in the research field of BRRI and BARI. The model has also been successfully applied in the Barind area showing increased yield with optimal water use. 'Adaptive Crop Agriculture Project' under the climate change cell of the DoE, being executed by CEGIS will identify and field-test crops which are adaptive to higher salinity

7.2.5 Indigenous Knowledge to Combat Desertification

The indigenous knowledge of the local population regarding land management may be encouraged as these are generally environment friendly. In Sal Forest Region of the Madhupur Tract, tree species like mango, Mahogany and Jackfruit grow in upland (*chalas)* around homestead where lower slopes *(baid*) are used for growing paddy. Sometimes gentle slopes and *chalas* are used for growing vegetables, maize etc. (NEMAP, 1995). This practice increases moisture retention, improves soil fertility and crop yield; and reduces surface runoff and thus halts soil erosion. Home garden system provides healthy ecosystem for humans, animals, birds, livestock, and miscellaneous flora and fauna. Homestead bamboos are planted because these develop rapidly and are good soil binders. Use of homestead ash is done to supplement potassium in the soil and to keep insects away from crops. Banyan trees are considered as a symbol of preservation of ecosystem because through its extensive root systems it holds large chunk of soil and provides shelter and food for birds and other wild animals. *Khari* development is encouraged in the Barind area to make storage of water by making embankment in some segments of a drainage/ irrigation channel. Trees and shrubs are planted to reduce further evaporation (Zuberi, 1998). Pond digging is done to facilitate judicious use of storage water for domestic and agricultural purposes. People of the entire village or community decide where to dig the pond and entire operation and digging and maintenance thereafter are being done on a cooperative basis. In the past, such ponds were

also used as storage of rainwater. These days they don't get sufficient water in the dry season as ground water recedes further below. The dry areas are now looking for suitable alternative cash crops like cotton, maize, sunflower, melon.
The practice of agro-silviculture creates a favorable environmental condition that reduces evapotranspiration and produces fuel wood, timber and fodder. Many indigenous systems are practiced in the hilly regions to facilitate various local problems related to watershed management and utilization of natural resources. Use of bamboo in earth dam construction; use of brushwood and waste woody material for soil conservation; harvesting of forest product by skidding; and production of various useful tools and implements are good examples of application of the indigenous system in the Hill Tract region.

7.3 Capacity Building

Under the capacity building and enhancement field, the following activities should be mentioned which have relevance to the UNCCD objectives.

7.3.1 Water Management Improvement Project (WMIP)

The project had been aimed at improving the performance of the water management systems in Bangladesh and ensuring their sustainability through improved operation and maintenance, and appropriate institutional reforms.

7.3.2 Follow-up on River Bank Protection Project (RBPP)

This project aims to reduce vulnerability of the poor by more extensive implementation of river training techniques developed under RBPP to mitigate against further river bank erosion which leads to disastrous loss of land, crops and property every year (World Bank, 2000 c).

7.3.3 Follow-up on Jamuna Bridge Multipurpose Project (JBMP)

The project is expected to make a positive contribution to the reduction of economic damages caused by erosion in the project areas by preventing the loss of about 7,800 ha of riparian land, including about 1,500 ha of urban area in Sirajganj and protect about 1,000 people from loss of livelihood, displacement and impoverishment. By preventing, perennial flow into the Bangali River from the Brahmaputra River, the project would prevent potential incremental flood damage to crops, property and infrastructure over an area of nearly 300,000 ha populated by more than two million people (World Bank, 2000 c).

7.3.4 Afforestation Programmes

The Government of Bangladesh has approved the Forestry Sector Master Plan (1995-2015) and promulgated the National Forest Policy 1994. Both the documents have emphasized nationwide afforestation program in the country with a 20% coverage of Bangladesh targeted in the Master Plan to be achieved by 2015. To attain this particular goal, the FD is resorting to undertaking plantation program under the ADP. As regards the number of FD projects to be implemented, the MoEF approves of the afforestation and social forestry programs proposed by the FD. The GoB moratorium on tree felling imposed in 1989 with a view to ensuring forest conservation has been extended to 2011. Further activities include attempts by the GoB to increase the coverage of protected areas in reserved forestlands by a future 10% by 2015. The GoB has also taken initiatives for afforestation in fallow and marginal land, as well as all other unused land available in the country. Social forestry programme has assumed the dimensions of a social movement throughout the country. As a result of the FD's extension services and training of local communities, a large number of private nurseries have been developed in the country. The number of nurseries now total about 10,000 and consequently,

there is a remarkable expansion of homestead forestry at the community level. The present Govt. is seriously committed to increase the forest cover rapidly in the country.

7.3.5 Forest Resource Management Project (FRMP)

The main objectives of the Extended Forest Resource Management Project under implementation are: (a) maintenance of old plantation of previous Forestry Resource Management Project (FRMP) activities completed in 2001 and (b) to continue expansion of plantation through planting the newly accreted coastal char lands. Achievements include (a) 22,797 ha of old plantation maintained, (b) 2965 ha of new mangrove plantation raised in the newly accreted landmass and (c) 400 ha of plantation raised under Participatory Forestry Development (PFD) under this project in the hill forests of Chittagong Hill Tracts.

7.3.6 Forestry Sector Project (FSP)

The Forest Department of Bangladesh is implementing the Forestry Sector Project (FSP) that covers 62 districts of Bangladesh. The project period has covered the time frame 1997-98 to 2005-2006. The primary objective of the project was to increase overall tree resource base of the country; to arrest depletion of forest resources; to enhance conservation of forests in selected protected areas and attain sustainable management of forest resources through local community participation.

The Forestry Sector Project has been completed in June 2006. Its achievements include 35, 000 ha woodlot plantation raised, 22,890 ha of strip plantation raised, 1850 ha plantation raised in newly accreted coastal charlands, 900, 000 nos. of coconut seedlings raised and distributed among local people at subsidized rate and 424,00000 seedlings (timber and fruit species) raised and distributed among local people at subsidized rate. The Forest Act 1927 has been amended, with major focus on the incorporation of Social Forestry in the Legal framework.

During the tenure of the project, the GoB has promulgated Social Forestry Rules 2004 aiming at institutionalization of Benefit-Sharing arrangement among stakeholders and already some 1, 70,000 beneficiaries have been organized under the benefit sharing scheme of this project.

7.3.7 Coastal Green Belt Project

The Coastal Green Belt Project completed by the FD achieved the following:

(a) 1394 km embankment plantation, (b) 7540 km strip plantation (roads, highways, railway and feeder roads), (c) 600 ha of foreshore plantation, (d) 125,69,000 nos. of seedlings (timber and fruit trees) raised and distributed free of cost and (e) 1172, 44,000 nos. of seedlings raised and distributed among local people at subsidized rate.

7.3.8 National Biodiversity Strategy and Action Plan (NBSAP) Project

The NBSAP has already been prepared and its implementation is ongoing. The NBSAP has been envisaged to be focusing mainly on building an unifying framework to guide and coordinate various biodiversity related programs and projects that are now under implementation at the very design stage and identifying national priorities in a more qualified manner. The NBSAP prepared reflects national sectoral aspirations and has started work on building further on the existing national strategies and plans. The successful preparation of the NBSAP constitutes a sound step forward towards meeting the national obligations to the implementation of the Convention on Biological Diversity (CBD).

7.3.9 Sustainable Environment Management Programme (SEMP)

SEMP, as the follow-up implementation of NEMAP, addresses the major environmental priorities identified by people through NEMAP. It is the first program approach initiative in the environment sector of the Government of Bangladesh, which comprised 26 components executed by the Ministry of Environment and Forest implemented through 21 government/non-government agencies throughout Bangladesh. Focus areas relating to the environment are Policy and Institutions; Participatory Eco-System Management; Community-based Environmental Sanitation; Advocacy and Awareness; and Training and Education. SEMP will support community capacities for sustainable management of environmental resources and strengthen the capacity of the public sector to develop new framework for policy development in support of enhanced community participation, protection of the environment, and sustainable management of the country's environment and natural resources. SEMP will benefit grassroots level people, particularly women, in eco-specific intervention areas through participatory ecosystem management. Efforts have been in place towards achieving natural resource management, biodiversity conservation, and restoration of habitats and livelihood options, which have proved very much relevant to combating land degradation and halting the process of desertification as well.

7.4 Identification of New Actions and Planned Measures

New activities and planned measures would include:

1. The implementation of the NAP as soon as it is formally approved.
2. Capacity building and resource mobilization for sustainable land use management in Bangladesh.
3. Some more actions under the MDGs and the PRSPs relevant to the UNCCD are as follows:
    a. Eradication of extreme poverty and hunger
    b. Promoting gender equality and empowering women
    c. Ensuring environmental security
    d. Ensuring global and regional partnership for development
    e. Promoting good governance
    f. Investment in human development
    g. Ensuring social security

7.5 Specific Actions to Strengthen National Capacity

There exist several programs for capacity building in the country. The following are the mentionable ones:

1. Sustainable Environment Management Programme (SEMP)
2. Participatory ecosystem approach under the BMDA
3. National environmental capacity building under the BEMP
4. National Biodiversity Strategies and Action Plan
5. Coastal and Wetland Biodiversity project in Cox's Bazaar and Hakaluki Haor
6. Riverbank Protection Project
7. Follow-up on Jamuna Bridge Multipurpose project
8. Forestry Sector Project
9. Forest Resource Management Project
10. Coastal Greenbelt Project

7.6 Action Programs

Details of the measures for natural resource conservation, institutional arrangements and monitoring and evaluation measures for the effects of desertification have been furnished in the chapters that follow.

7.7 Measures to Improve the Economic Environment

The Government of Bangladesh is in the process of establishing an UNCCD Trust Fund to address the land degradation issues in a sustainable manner by ensuring alternative livelihood options for the rural poor. Further activities to the above effect have been earmarked especially in the PRSPs, MDGs and the current national investment plans.

7.8 Linkage Achieved with Sub-regional and Regional Action Programs

The Ministry of Agriculture will consider participation in the TPN4. Bangladesh considers ensuring effective participation and linkages in the regional and sub-regional programmes under the aegis of the UNCCD and the Thematic Programme Network (TPN) for cooperation between the affected country parties. These efforts will foster cooperation with the regional countries on these issues, Bangladesh has joined TPN 2: Agro-forestry and Soil Conservation in Arid, Semi-arid and Dry Sub-humid Areas. Possibilities are also being explored to join in TPN 4: Water Resources Management for Agriculture in Dry Areas and other TPNs relevant to Bangladesh's situation.

Bangladesh is in the process of launching the recently approved TPN 7: Combating Coastal Land Degradation with the consent of the UNCCD Secretariat. It may be mentioned that detailed background information of Bangladesh's and regional coastal land degradation was presented by the Bangladesh delegation in the Asian Focal Points Meeting held in Damascus from 8-12 July 2003. The major focuses were on: adverse impacts of cyclone, tornado, flood, river bank erosion, salinity intrusion, drought and deforestation causing coastal land degradation.

Secondly, this was placed in the CRIC 1 meeting held in Rome from 11-22 November, 2002 to include this proposed new TPN - 7: Combating Coastal Land Degradation.

Thirdly, it was placed in the Sixth Asian Regional Focal Points' Meeting and Second Asian Ministerial Conference held in Abu Dhabi during 6-11 June, 2003. The concerned parties agreed on the matter for establishing a new TPN on "Combating Coastal Land Degradation" and framed recommendations to be placed in the COP-6 for approval.

Finally, the proposal of the said new TPN 7 was placed in the COP 6, UNCCD held in Cuba, Havana, and was approved to establish a separate TPN as per the recommendation of the Sixth Asian Regional Focal Points' Meeting and Second Asian Ministerial Conference held in Abu Dhabi.

7.8.1 Development of National and Regional Level Programs

Bangladesh has already completed a royal Bengal Tiger census under a project entitled 'A Two-country Approach: Conservation of World Heritage Site in the Sunderbans' jointly with India. Moreover, Bangladesh being the lower riparian country, considers ensuring effective joint implementation of other activities, such as, transboundary water issues and biodiversity

conservation. Other possibilities of projects for joint implementation relevant to land degradation will be explored during the implementation of the NAP.

7.8.2 Strengthening the Efforts of Technological Advancement

Through SDNP efforts are underway to undertake capacity/need assessment and identify the nodal institutions as well as modus operandi of establishing electronic networking in the country. New technologies should be economically profitable, socially acceptable and technically sound. Currently, Bangladesh is concerned about integrating research findings and field activities.

7.9 Effectiveness of Measures in Local Capacity Building

The present government and concerned organizations are committed to attaining capacity building, as appropriate for accomplishing all necessary obligations due to the nation's being a party to the UNCCD as well as other MEAs. For example, Bangladesh has already submitted a proposal, 'Capacity building and resource mobilization for Sustainable Land Management in Bangladesh; to GEF for approval. The main objective of another project under implementation titled 'National Capacity Self-Assessment' project is to identify and subsequently build capacity for implementation of the UNCCD along with the CBD and the UNFCCC through identifying country level capacity building needs and priorities towards contributing, as appropriate, the global concerns as regards environmental management.

7.9.1 Degree of Responsibility in Natural Resource Management on Local Communities

Local capacity building and utilization of indigenous technologies have been enhanced through the involvement of NGOs and CBOs in managing the natural resources in rural areas. This process has also enhanced the mobilization of local women to work in groups in areas of saving and credit, soil and forest management. These activities have promoted local communities to assume their responsibilities for management and introduce best method for a sustainable use of resources. A feeling of ownership over the natural resources has also been developed which will have long-term effects on its management.

BEMP and SEMP have implemented several community based environment management projects at local level. The GEF project on Coastal and Wetland Biodiversity, being implemented by DOE, has a strong focus on community participation. The Forest Department activities, such as the Coastal Afforestation Project, Sundarban Biodiversity Conservation Project strongly emphasized community participation. Further, some recent resource management projects under implementation by the NGOs, such as the MACH project funded by the USAID mainly focus on GO/NGO collaboration.

7.10 Resource Made Available for NAP Implementation and Partners Involved

Bangladesh has received technical and financial assistance in a number of natural resource management programs through multilateral and bilateral funding. Possibilities of arranging more funds on partnership basis will also be explored. Bangladesh is also sounding the potentials for mobilizing fund through establishing a Land Degradation Trust Fund.

8. Financial Mechanism

8.1 Adopted Financial Mechanism

The external funding mechanisms available for the implementation of the UNCCD can be considered under the following categories:

- Global Mechanism
- GEF
- Other international organisations such as the UNDP, UNEP, IFAD, FAO etc which could take up specific projects/programmes relevant to combating land degradation/ desertification
- Bilateral assistance
- Multilateral assistance: ADB, World Bank.

Provisions have also been kept in the current PRSPs national investment plan for activities leading to the achievement of the MDGs related to land degradation/ desertification in relevant sectors, viz. Ministry of Environment and Forest, Ministry of Land, Ministry of Agriculture; Ministries of Agriculture, Water Resources, Local Government, and Relief & Rehabilitation.

8.1.1 Measures to Facilitate the Access to Local Sources of Funding

The Government of Bangladesh is in the process of establishing a Land Degradation Trust Fund for mobilization of local financial resources. The NGOs and CBOs may submit technical and financial proposals to secure funding from these sources, and the Executive Committee would select the proposal and allocate necessary funds. Although the said Trust Fund would be a legal funding mechanism, it would depend on limited national budgets. However, these sources have limited funds and are unable to meet the demand of NGOs and CBOs. Besides, local actors may receive some funding through the government program for joint implementation and management. These sources may be designed for environmental and resource management which contributes to combating land degradation and desertification process. Bangladesh would welcome any offer to strengthen this fund as a financial mechanism for combating desertification and natural resource management programs.

8.2 Technical and Financial Assistance Required

Bangladesh will require adequate technical and financial assistance for the implementation of the UNCCD, specifically for the implementation of NAP, public awareness, capacity building and information exchange. Similarly, technical assistance would be required to prepare inventories of traditional knowledge, know-how, practices and technologies. Partnership building and private sector involvement represents other priorities for technical cooperation. Technical assistance is also required to strengthen the process of community empowerment in the field of forestry, soil conservation, watershed management and alternative sustainable livelihood.

9. Identification of Benchmarks and Indicators for Evaluation of Land Degradation/ Desertification

9.1 Benchmarks and Indicators

Full-fledged formal benchmarks and indicators are yet to be adapted in Bangladesh. They will be established during the implementation of the NAP. However, various research and academic institutions are developing benchmarks and indicators in a number of fields including species monitoring, wildlife assessment, land capability, vegetation monitoring, soil fertility etc. The relevant institutions such as, the Forest Department, the Department of Agriculture, Forest Research Institute, Agriculture Research Institute, Bangladesh Agriculture Research Council, Plant and Life Science Departments of the universities etc.

9.1.1 Criteria for Selection of Indicators

Integrated and focused information that can provide data on threshold levels, status and evaluation of relevant physical, chemical and biological processes are generally considered as indicators. Indicators can be easily communicated to the public or policy-makers and can be used as reliable information in geographical information systems (GIS) to determine spatial extension and geographic distribution of degraded areas and to relate direct and indirect causes and impacts. For all these purposes, selection of complementary indicators reflecting different aspects of environmental stress is necessary.

9.2 Operational Mechanisms for Monitoring and Evaluation

For the successful implementation of the UNCCD mandates, an effective and efficient monitoring and reporting system has to be in place opportunely. This M&E system will also work as a reporting organ liaising with the UNCCD Secretariat.

Conceptually, the Monitoring and Evaluation will involve:

- Collection of information about the status of desertification in Bangladesh and implementation of UNCCD activities by different implementing institutions and organizations and
- Reporting periodically on the Convention issues to implementing bodies and the public in general

Monitoring and Evaluation will be undertaken to review

- performance on implementation
- impacts on the status of desertification/land degradation

The M&E System will report periodically about its findings in the different areas in a regular basis. Additionally, the M&E System will report regularly to the public through the different communications media of Bangladesh (newspapers, radio, TV and others).

9.3 Implementation Indicators

Proper and regular monitoring and evaluation using the appropriate indicators for combating land degradation and desertification processes will be possible to undertake while implementing the NAP. Bangladesh will follow the logical framework approach for proper monitoring and evaluation of projects related to implementation of UNCCD. However, Bangladesh is practicing evaluation and monitoring process each and every development project which has direct/indirect relevance to combating desertification and land degradation.

10. Tasks Ahead

The tasks to be accomplished in the near future would include the effective implementation of the NAP, NCB and an M&E system for effecting efficient follow-up on all the proposed and ongoing activities and processes. Interministerial coordination, capacity building nationwide to address the UNCCD mandates and institutionalizing the same are among the felt needs which must be met. Synergising the regional as well as global linkages is also considered a necessity.

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Annex

C. UNCCD Country Profile

(BANGLADESH)

This UNCCD country profile has been provided by:
Name of focal point institution/ministry/office: Ministry Of Environment and Forest
Date: 10 July 2006
Mailing address: Bangladesh Secretariat, Dhaka-100, Bangladesh.
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Biophysical indicators relating to desertification and drought

1. Climate

1.1. Index of aridity[1] _____
1.2. Normal rainfall 2,540 mm
1.3. Rainfall standard deviation _____

Sub-national areas	mm
1. Dhaka	2,005
2. Chittagong	2,834
3. Rajshahi	1,616

2. Vegetation and land use

2.1. NDVI (normalized difference vegetation index) _____
2.2. Vegetation cover (% of total land area) 69%
2.3. Land use (percent of total land) _____ 71%

(000 acre)

Land use		1990-1999	2000-2005
Arable crop land		19,642	19,871
	Irrigated	12,251	12,761
	Rainfed	7,391	7,110
Pasture		1,166	773
Forest and woodland		5,656	6,423
Other land		961	981

[1] The index of aridity is the ratio P/PET; P= perception, PET= potential evapotranspiration. Climatic zone maps to be annexed if available in a scale of 1/million.

3. Water resources

3.1. Fresh water availability (million m^3) _____
3.2. Fresh water resources per capita (m^3) _____

3.3. Agricultural water use (million m^3) _____

3.4. Industrial water use (million m^3) _____

4. Energy

Consumption _____

4.1. Energy use per capita (kg oil equivalent) _____

4.2. Agricultural energy use per hectare (millions of BTU)

Production

4.3. Energy from renewable excluding combustible Renewable and waste (% of total supply) _____

Renewable- Consumption by sector

4.4. Industry (% of total renewable consumption) _____

4.5. Residential (% of total renewable consumption) _____

4.6. Agriculture (% of total renewable consumption) _____

5. Types of land degradation

Types of degradation	1990-1999		2000-2005	
	million ha	Percent of total area	million ha	percent of total area
1. Water erosion	1.7	-	-	-
2. Soil fertility decline	8.0	-	-	-
3. Soil organic matter depletion	7.55	-	-	-
4. Waterlogging	0.7	-	-	-
5. Barind	0.773	-	-	-

6. Rehabilitation

Lands under rehabilitation	1990-1999	2000-2005
Rehabilitation of degraded crop land (km^2)		
Rehabilitation of degraded range land (km^2)		
Rehabilitation of degraded forest (km^2)		