CHAPTER 15
ENVIRONMENT AND DEVELOPMENT

[*The issue of environment is gaining increasing prominence in the policy agenda of the Government. According to Vision 2021, the Government has been implementing various programmes which include, among others, protecting Bangladesh from the adverse affects of global warming, creating pollution-free environment and also adopting policies and planning to protect water resources of the country. Bangladesh has already achieved two remarkable targets of MDG declared by UN like ensuring the availability of safe drinking water and sanitation facilities. Currently, Bangladesh is preparing the second National Communication under which steps taken and to be taken for adaptation and mitigation of climate effects will be determined. Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009 has been prepared to face the adverse effects of climate change. Beside this, a Climate Change Trust Fund has been established and relevant policies to operate the Fund have been formulated. In the meantime Bangladesh Climate Change Trust Act,2010 has been enacted. In compliance with the Environment Conservation Act,1995 and Environment Conservation Rules,1997 the mechanism for issuance of environment clearance certificate has been introduced for new industries or projects. Being concerned about the environmental balance, the Government has started preparing a National Work Plan to conserve the living resources.****]***

World Environment Movement and International Initiatives

The Stockholm conference on environment held in 1972 brought to the fore the concept of environmental balance in the pursuit of development. Following the decision of the conference, many countries of the world created environmental institutions (Environment Agencies/Ministry) and undertook environment management related initiatives. In addition, several international conventions, like the Basel Convention, the Rotterdam Convention and the Stockholm Convention have been adopted to mitigate and control the adverse impacts arising from the use of hazardous and harmful chemical substances. The International Panel on Climate Change (IPCC) that came into existence in 1988, has been relentless in undertaking research on various issues related to changes in the global climatic conditions and creating public opinion and awareness towards undertaking required steps in confronting potential challenges. The world community is now united to take actions towards implementation of the recommendations put forward by the research reports.

Kyoto Protocol

On December 11 1997, the negotiations on the Kyoto Protocol under the United Nations Convention on Climate Change Framework were completed**.** The Kyoto Protocol that was signed to reduce carbon dioxide and greenhouse gas emission responsible for increasing global warming, mutating avalanche and rising sea-level came into force from 16 February 2005. As of now, 137 developing countries have ratified the Kyoto protocol. Although China and India are the major polluters, they are not required to

meet the quantitative limitations of emitting greenhouse gas. Kazakhstan and the US did not ratify the treaty. Set out below is a list of countries showing greenhouse gas emissions:

Table: 15.1 Greenhouse Gas Emissions of Some Selected Countries

Country	Annual CO_2 emissions (in thousands of metric tonnes)	% of global total
World	29,888,121	100
China	7,031,916	23.33
United States	5,461,014	18.11
European Union	4,177,817	14.04
India	1,742,698	5.78
Russia	1,708,653	5.67
Japan	1,208,163	4.01
Germany	786,660	2.61
Canada	544,091	1.80
Iran	538,404	1.79
United Kingdom	522,856	1.73
South Korea	509,170	1.69

Source: United States Department of Energy's Carbon Dioxide Information Analysis Center (CDIAC) 2008

Copenhagen Accord

Copenhagen Accord is the most important among the global initiatives. The Heads of states of 120 countries, representatives from 194 countries, numerous environmentalist organisations and experts took part in a historical two-week long Conference on Climate Change held in December, 2009 in Copenhagen, Denmark. At the end of the conference an agreement known as the "Copenhagen Accord" was signed. In this conference, a recommendation was adopted for formulation of "compulsory legal agreement" with an understanding that the global carbon emission is to be reduced to keep the rate of increase in global temperature below 2 degree celsius. For the purpose of meaningful mitigation actions and transparency on implementation, developed countries committed to a goal of jointly mobilising US$ 100 billion a year until 2020 to address the needs of developing countries.

In December, 2010 a conference of the parties 16 (cop-16) was held in Cancun where some important decisions are taken about the actions needed to restrain the adverse effect of climate change.

The salient features of the Copenhagen Accord include:

- Establish the Adaptation Committee to oversee the adaptation activities.
- Help and fund those countries which have more than 10 projects.
- Establish the Green Climate Fund
- 100 billion dollar each year will be supplied by the developed countries till 2020.

- Finalize the green climate fund with a Transitional Committee consisting of 40 members.
- Decisions taken to administer the Fund by a board consisting of representatives from both developed and developing countries.
- Build a technology development and exchange system by establishing a technology executive committee and a climate technology centre.

The Progress Status of Bangladesh in Achieving the Targets of Millennium Development Goals (MDGs)

Ensuring environmental sustainability (Goal-7) is one of the most important goals under MDGs declared by UN. According to a report titled "Millennium Development Goals: Bangladesh Progress Report 2010" published jointly by UN Development Program and Bangladesh Government, Bangladesh has already achieved a remarkable progress in achieving the targets under MDG 7 by ensuring the availability of safe drinking water and improved sanitation facilities. Below is a list of Bangladesh progress in achieving the targets under MDG 7 linked to ensuring environmental sustainability:

Table 15.2: Environment Related Progress in Achieving Millennium Development Goals

No.	Objective Aims and Indicators	Base Year 1991	Current Status	Target Within 2015
Goal 7.B: Reduce Biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss				
7.1	Proportion of land area covered by forest	9.0	19.2(2007) Density of tree>10%	20.0 Density of tree>70%
7.2	CO_2 emission (metric tonnes per capita)	0.14	0.30	
7.3	Consumption of ozone-depleting Substance ((metric tonnes)	195	127.90(2009)	0
7.4	Proportion of fish stocks within safe biological limits		54 inland &16 marine	
7.5	Proportion of total water resources used		6.6(2000)	
7.6	Proportion of terrestrial and marine areas protected	1.64	1.78% terrestrial & 0.47 marine	5.0
7.7	Proportions of species threatened with extinction		201 inland 18 marine	
7.8	Proportion of population using an improved drinking water sources	78	86(2009)	89
7.9	Proportion of population using an improved drinking water sources	39.0	54(2009)	70
7.10	Proportion of urban population living in slums		7.8(2001)	

Source: UNDP, Bangladesh, 2010

Climate Change

It is well recognised by both the scientific and the negotiating community that Bangladesh would be one of the most adversely affected country in the eventuality of climate change.

According to the Intergovernmental Panel on Climate Change (IPCC), the principal cause of climate change is the increase in global average temperatures. Climate change has occupied the centre stage of all

deliberations on environmental issues in today's world. Continual increase of global warming has affected the seasonal pattern and endangered seasonal diversity. As a result, intensity of climate change related disasters such as excessive rain and flooding, cyclone, tornado and tidal surge has increased. *Sidr* and *Aila* are the best examples of such intensity.

The notable adverse impact of climate change is the rise of sea-level. Sea-level has risen by 10 to 25 centimeters over the past century. About 63.4 crores people across the world live in the coastal zones and two-third of the cities are situated in the coastal zones. Bangladesh is one among the worst victims of the consequences arising from the rise of sea level. The vulnerability due to climate change depends on several factors such as geographical location and socio-economic condition. The type and magnitude of vulnerability vary in different regions of the world. Poor economic condition of the people of Bangladesh and reliance on the natural resources has intensified this vulnerability.

In Bangladesh, the following changes have been observed in climate trends and variability:

- Average temperature has registered an increasing trend of about 1°C in May and 0.5°C in November over the last 14 years (1985 to 1998).
- Saline water from the Bay of Bengal is reported to have penetrated 100 km or more land along tributary channels during the dry season.
- The annual mean rainfall exhibits increasing trends in Bangladesh.
- Serious and recurring floods have taken place in 2002, 2003, 2004 and 2007.
- Frequency and intensity of cyclones originating from the Bay of Bengal have increased. Turbulent sea is creating adverse effects on fishermen's livelihood.

Bangladesh's Initiatives to Meet the Challenges Arising from Climate Change

Bangladesh is one of the signatories of United Nations Framework Convention on Climate Change (UNFCCC), and Kyoto Protocol. Bangladesh also ratified these Conventions in 1992 and 1994 respectively. It entered into Kyoto protocol in October 2001. The Clean Development Mechanism (CDM) is an important part of the Kyoto Protocol. As per CDM, industries in developed countries may earn Certified Emission Reduction (CER) credit by investing in the developing countries.

Two-tier National Designated Authority (NDA) has been formed to approve CDM projects in Bangladesh in order to implement the Clean Development Mechanism (CDM) established under the auspices of the Kyoto Protocol with a view to reducing the emission of GHG along with facilitating adaptation mechanism. The first tier of NDA is the National CDM Board that comprises five members, the Principal Secretary to the Prime Minister as Chair and Director General, Department of Environment as the Member-Secretary. The second tier is the 22-members National CDM Committee chaired by the Secretary, Ministry of Environment and Forests and Director (Technical), Department of Environment being the Member-Secretary. Until now, National CDM Committee has approved 08 CDM projects. Infrastructure Development Company Ltd. (IDCOL) with the assistance of the World Bank, Global

Environment Facility (GEF) has installed 50,000 Solar Home System (SHS) all over the country up to June 2008. The number increased to 403,000 by October 2009. A target for installing 1000,000 SHS by 2012 has been set with the financial assistance from the World Bank, KfW (Kreditanstalt für Wiederaufbau**)**, GTZ (now GIZ), Asian Development Bank(ADB), Islamic Development Bank(IDB) and the Government of Bangladesh.

Adaptation and Mitigation

Bangladesh prepared and submitted its National Adaptation Programme of Action (NAPA) in 2005 as a step towards implementing the decisions adopted by the Conference of the Parties to UNFCCC. Ministry of Environment and Forests also updated the NAPA document in 2009.

Formulation of the Second National Communication is now in progress with the support from GEF-UNDP in accordance with the provisions of UNFCC. Steps taken and to be taken for climate change adaptation and mitigation will be identified in the Second National Communication.

UNFCCC has established the Least Developed Countries (LDC) Fund and Special Climatic Change Fund (SCCF) to address climate change risk management issues for the least developed countries. A coastal afforestation project titled Community-Based Adaptation to Climate Change is being implemented by the Department of Forest with the financial assistance from LDC fund. UNFCCC has also established Adaptation Fund. Bangladesh has been selected as an alternate member of the 32-member Adaptation Fund Board for the least developed countries group.

To tackle the adverse effects of climate change, a Climate Change Strategy and Action Plan (BCCSAP) 2009 has been prepared, a Climate Change Trust Fund Policy has been formulated and a Climate change Trust Fund has been established. In the mean time Bangladesh Climate Change Trust Act,2010 has been enacted. In order to implement the BCCSAP, focal points in different ministries have been identified. Each of the key sectoral ministries has already set up separate Climate Change Cell in order to streamline and coordinate climate change activities in their respective sectors. The Ministry of Environment and Forest has also set up a Climate Change Unit in order to streamline and coordinate overall climate change activities.

In FY 2011-12, an additional amount of Tk. 700 crore has been allocated to six thematic areas to tackle the possible disasters arising from climate change.

The thematic areas are:

1. Food security, social protection and health security
2. Comprehensive disaster management
3. Infrastructure
4. Information and research management
5. Mitigation and low carbon development
6. Capacity building and institutional strengthening

Some important programmes among forty-four programmes under six thematic areas mentioned above are listed below:

- Development of climate resilient cropping varieties, crop management;
- Adaptation to the climate change in the agriculture, fishery, livestock and health sectors;
- Climate change related disaster management programme ;
- Climate change oriented modeling, sea level rise, biodiversity and economic impacts;
- Renewable energy, afforestation and mitigation related programmes;
- Embankment, cyclone shelter construction and repairs related programmes;
- Development of advance warning system for flood, drought, cyclone;
- River excavation and re-excavation related programme and
- Adaptation matters related to flood, flash flood and tidal surge.

Along with all these activities, if all 44 programmes are implemented, it will help to tackle the adverse impact of climate change. With the financial support of Climate Change Trust Fund the Trustee Board approved 58 projects which are all under implementation.

On the other hand, the Department of Forest has taken up 8 projects which are being implemented as planned. These are: (1) Raising of Seedling for afforestation to reduce adverse impact of climate change (2) Climate Change Resilient Afforestation in the Core Zone of Central Circle. (3) Plantation of BWDB's Embankment in the Coastal Belt and its adjacent *Char* Areas. (4) Revegetation of *Madhupur* Forest through Rehabilitations of Forest Dependant Local and Ethnic Communities (5) Motivating Community People to Conserve the *Sundarbans* and Vote for its inclusion as new seven wonders in the world heritage. (6) Forest Information Generation and Networking system. (7) Reduction of Carbon Emission through Establishment of *Sonaichari* Botanical Garden Bangladesh (8) Coastal Afforestation to Combat Adverse Impact of Climate Change. Besides these, several other projects will be undertaken to tackle the adverse effets of climate change.

Environmental Protection and Development Programmes

Environment protection is an important issue in various development programmes of the Government. It has already started dealing with this issue in designing sectoral policies and planning. The Ministry of Environment and Forest is implementing a series of programmes to address the concerns surrounding environment protection. Noted below are some of the programmes taken up by the departments/agencies of the Ministry:

Department of Environment (DoE)

The Department of Environment is tasked to implement the Government's environment policies and programmes. Important activities carried out by DoE in FY 2010-11 include, *inter alia*:

- Completed activities as set out in the medium-term budget framework of the Ministry

- Division/district level offices have been delegated with powers and authorities as laid down in Environment Conservation Act,1995 (as amended up to 2010).
- More pronounced actions being taken to enforce the Environment Conservation Act,1995 (as amended up to 2010).
- Environmental clearance fees and other types of fees under Bangladesh Environment Conservation Rules,1997 has been enhanced
- Environment clearance certificate and renewal of the same on a regular basis.
- All industries and projects have been brought under the Environment Conservation Act,1997 by expanding DoEs activities in 21 districts.
- Mobile court operation has been intensified to take immediate action against environmental offences.
- Fine against environmental offences has been charged regularly.

Activities Related with the Ozone Layer Protection of the Department of Environment

Bangladesh accessed Montreal Protocol on 2 August 1990 and ratified its London, Copenhagen, Montreal and Beijing amendments in 1994, 2000, 2001 and 2010 respectively. Bangladesh is an Article 5 (1) country according to this protocol. Restriction of the import and use of chlorofluorocarbon (CFC) was imposed in 1999 and the total phase-out was completed in 1 January 2010.

Actions underway by DoE over the last three years to protect the ozone layer include:

- Survey and Data reporting on the use and import of Ozone Depleting Substances (ODS) to the Ozone Secretariat each year.
- Observe International Ozone Day to make the mass people aware of the harmful effect of the ozone layer depletion each year.
- Provide ODS import license each year to restrict ODS import
- Deliver training programme for capacity building of the workers associated with refrigeration and air conditioning and garment sector.
- Phase-out CFCs in the manufacturing of metered dose inhalers (MDIs) in Bangladesh. Transition Strategy and Conversion projects are being implemented with the assistance of UNEP and UNDP respectively financed by Multilateral Fund (MLF). It is expected that the complete phase-out from MDI sector will be accomplished by 2012.
- Phase-out hydro-chlorofluorocarbon (HCFC). Draft HCFC Phase-out Management Plan (HPMP) was developed to submit it in the 65th Executive Committee Meeting of the MLF.
- Phase-out HCFC from foam sector, an investment project has been conceived. The project will help meet 2015 target of the protocol signed by Bangladesh.

Partnership Programmes to Protect Environment

The Department of Environment has undertaken partnership programmes to ensure mass participation to conserve the environment of the country. As part of the programme, the Department has established partnership with different children organisations, educational institutions and community organisations. The Department of Environment supports these organisations in their environment conservation programmes. These organisations also join hands with DOE programmes during the observance of World Environment Day and other occasions. To build an environment sensitive generation, DoE has taken up a project titled Promotion of Environmental Awareness among School Children through Green Clubs. Six Green Clubs has been set up in the schools of Dhaka and Chittagong. Green Club supervisors have been appointed to administer day to day activities of the green clubs established under this project. DoE also organises Meet the People Programme to listen to the complaints of the general mass and their advice to ensure clean environment.

River Water Pollution in Bangladesh

Surface water quality monitoring carried out by DoE reveals that the river water quality around Dhaka city is much more polluted than the water of other rivers in Bangladesh. It has been estimated that the total financial loss will be, at least, US$ 51.1 billion over the next 20 years if no action is taken to control pollution. Contrarily, the net economic benefits of a clean Dhaka will be more than US$ 50.0 billion over the next 20 years (Dhaka Environment Programme,2005). In the rainy season, the quality of the water of the Shitalaksha river remains within the set standard of Environment Conservation Rules,1997. But in dry season the quality of the water goes well below that standard. Especially after 2007 there is a serious degradation of the water quality. Rapid urbanisation, industrialisation, agricultural development, excessive population growth and upstream withdrawal of water from transboundary rivers are the proximate causes for degradation of river water quality in Bangladesh. The water quality of river *Balu* is much below the standard of Environment Conservation Rules,1997 in rainy and dry season (except pH).

Air Pollution

DoE is implementing a number of projects to control air pollution. To upgrade the air standard, a project titled The Clean Air Sustainable Environment (CASE) Project is being implemented by DoE which has two main components:

- Environment – emissions from brick fields is included in this component. DoE is implementing this component and
- Vehicles - vehicles management and technical aspects are included in this component.

The implementing agencies of vehicle component are Dhaka City Corporation and Dhaka Transport Coordination Board. The major activities under this project include:

- Capacity building for implementing Sustainable Environmental Initiative (SEI) in transport and brick industry,
- Reduction of emission from brick industry,

- Mitigating acute traffic congestion in Dhaka,
- Introduction of Bus Rapid Transit (BRT) at the capital city under the Government's Strategic Transport Plan (STP) and
- Reduction of emission from vehicles.

A project titled Air Quality Improvement through Clean Fuels and Vehicles is being implemented with the financial assistance from United Nations Environment Programme (UNEP). According to the recommendations of a meeting titled Fourth Global Partnership Meeting for Clean Fuels and Vehicles held under the auspices of UNEP, a time-bound road map has been prepared at the national and regional level to reduce sulphur contents in the fuels of vehicles globally as well as to introduce appropriate technology to make vehicles environment-friendly. In continuance of this, a programme titled Partnership for Clean Fuels and Vehicles (PCFV) has been taken up to assist in policy formulation and implementation of the agenda for the improvement of air quality in the cities of developing countries. After UNEP's presentation on PCFV under Male declaration, Bangladesh expressed its interest to participate in these activities. The major objectives of this survey project include- (a) formulation of an action plan for the reduction of sulphur content to 50 PPM in diesel fuels as an interim step, (b) recommendation on emission standard for vehicles, (c) recommendation for a national fuel economic policy, (d) sensitising the people at national level about the usefulness of air quality standard, fuels with low sulphur contents and pollution-free vehicles for health and environment. 'Schedule-2' of Environment Conservation Rules,1997 has been amended to replace the air quality range.

Control of Industrial Pollution

In compliance with the Environment Conservation Act,1995 and the Environment Conservation Rules,1997 the mechanism for issuance of environmental clearance certificate has been introduced for new industries or projects after assessing the project area and pollutants to be emitted or discharged by the industries or projects to be set up. For highly polluting industries, environmental clearance is given after setting up Effluent Treatment Plant (ETP). Steps have been taken to set up Effluent Treatment Plants for the existing industries with the support of the Chamber of Commerce and Industries and the concerned sector-associations.

A project titled Survey and Mapping of Environmental Pollution from Industries in Greater Dhaka and Preparation of Strategies for its Mitigation is being implemented with a view to formulating and undertaking an action plan on accurate assessment of the number and pollution loads of various industrial units operating in greater Dhaka district and controlling pollution made by them. Information regarding exact location of various industrial units, their types, dimensions, waste characteristics and whether or not they are being operated in conformity with the existing Acts, Rules and Regulations were collected through this project.

Forest Department (FD)

Forest Department is managing forests for biodiversity conservation leading to sustainable development. The main objective of Bangladesh Forest Department is to expand forest land, to conserve bio-diversity

and wildlife, to protect environmental balance and to uplift socio-economic condition through participatory forestry programme. The total area of Bangladesh is 14.757 million hectares, of which 2.52 million hectares is forestland corresponding to 17.08 percent of total area of the country. Out of 2.52 million hectares of forestland, 1.52 million hectares (10.30%) are government forests. 0.73 million hectares (4.95%) are unclassified state forests and 0.27 million hectares (1.83%) are village forests. 1.52 hectares forestlands are managed by Forest Department and unclassified state forests of Chittagong Hill Tracts are under the control of district administration.

Forest Department has been implementing different types of development projects and programmes to enrich depleted forest resources, to ensure supply of raw materials to forest-based industries, to conserve and develop bio-diversity, environment as well as wildlife and to expand eco-tourism for the recreational facilities of the people. Different types of training programmes have been included to develop technology in forest management under these development programmes. Along with development programmes, different extension services are being undertaken to create suitable environment for expanding forest areas as well as growing trees on waste and marginal lands with participatory approach.

During FY 2010-11, the Forest Department implemented 19 development projects (17 investment projects and 2 technical assistance project) with an ADP allocation of Tk.11418.00 lakh. Out of this allocation, an amount of Tk.10763.68 lakh was spent, which was 94.27 percent of the allocation. Plantation programme was the main component among other activities. Long rotation and short rotation plantation, strip plantation, *char* land plantation, medicinal plantation, rare species in eco-park and fruit trees plantation for wildlife, herbal plantation and plantation for habitat development of wildlife were established under this plantation programme.

Side by side, the Forest Department also carried out plantations under the revenue budget. In FY 2010-11, some of the important programmmes of forest Department are-

- Bangabandhu National Award For Wildlife Conservation introduced from 2010
- Continued distribution of benefits among the participants involved in the Social Forestry Programme
- Tree Farming Fund is being used for sustainable replanting programme
- Compensation policy for casualities caused by wildlife-2010 approved by the Cabinet
- Compensation rule of victims for forest protection-2011 approved by the Cabinet
- Transit Rule for Bangladesh-2011 approved by Cabinet
- Tree Conservation Act-2010 approved by Cabinet.

Social Forestry

Social forestry activities is an important programme of the Forest Department which is playing a vital role in reduction of poverty. The department implemented four development projects with the assistance of ADB (Asian Development Bank) since 1981. During FY 2010-11, the department carried out

block/woodlot plantation in 17151.87 hectares, 6201.83 km Strip plantation and raised 253.857 lakh seedlings under different projects and programmes under the revenue budget.
Presently, the department has been implementing seven projects, *viz*

- Reedland Integrated Social Forestry Project (1st Revised)
- *Agar* Plantation (1st Phase)
- Afforestation in the Denuded Hill Areas of Chittagong North Forest Division(2nd Phase)
- Biodiversity Conservation and Poverty Alleviation in the Greater Rajshahi and Kustia Districts Projects
- Participatory Social and Extension Forestry in Chittagong Hill Tracts
- Bamboo, Cane and *Murta* Plantation (2nd Phase)
- Poverty Alleviation through Social Forestry

Aside from these projects, two programmes like (1) Afforestration Program in the Denuded Hill Areas of Greater Sylhet and Cox's Bazar Districts (2nd Phase), (2) Afforestration Program in the Canal's bank, Embankment and Link road of *Tista* Barrage Irrigation Project for poverty reduction are also being implemented. The department is implementing social forestry programme successfully. Poor, marginal farmers and distressed women are involved in the social forestry programmes and there is a legally binding definite share of benefit for them.

In FY 2009-10, a total of Tk. 743.15 lakh, was distributed among 2124 beneficiaries as their share. To date about 5 lakh beneficiaries have been involved with social forestry activities. In the meantime, 85,910 poor beneficiaries have become independent after receiving Tk. 13268.62 lakh, as their share.

Bio-diversity Conservation

Conservation of bio-diversity is an important factor for protection and development of environment. The Bio-diversity conservation issues have been addressed in Forest Act and Environment Act. As per provision made in Wildlife Preservation Act,1974, three categorized protected areas were established. In addition, till date, 28 protected areas have been established to conserve biodiversity and natural environment, to develop ecotourism and to create facilities for education and research in different forest areas of the country. Moreover, the Bangladesh Government has declared 12 areas viz. Coxbazar-Teknaf Sea beach, St. Martin's Island, *Sonadia* Island, *Hakaluki Haor*, *Tanguar Haor* & *Marjat Haor* of Sunamganj, Gulshan-Baridhara Lake, *Sundarban* and four Rivers around the Dhaka City as Ecologically Critical (ECA) under Environment Conservation Act,1995. According to Ramsar Convention, the Government has undertaken major development activities to conserve the biodiversities of wetlands including *Tanguar Haor*. The *Sundarban* and *Tanguar Haor* have been indicated as Ramsar Site. The World's largest mangrove forest Sundarban (*Sundarban* East Wildlife Sanctuary, *Sundarban* South Wildlife Sanctuary and *Sundarban* West Wildlife Sanctuary) has been declared as world heritage site by UNESCO on 6 December, 1997 for conservation of biodiversity.

Steps Taken to Conserve Biodiversity by Forest Department:

The Forest Department has been implementing a number of development projects and programmes such as Further Development of *Bangabandhu* Safari Park, Biodiversity Conservation and Development in the *Banshkhali Upazilla* and *Chunati* Wildlife Sanctuary, Chittagong (1st Revised), Establishment *Dhanshiri* Eco-Park and *Ramsagar* National Park Development (Including Recreation Centre of *Shingra*, *Rani Sagor* and *Ashurar Beel*), Establishment *Tilagarh* and *Barshijora* Eco-parks at Greater Sylhet District, *Bangabandhu* Safari Park, Gazipur, Enrichment bio-diversity and creation of recreation facilities at Lalmai, Kotbari, Bio-diversity conservation and ecotourism development of reserved forest at *Khurusia* Range under Chittagong South Division, Creation of eco-tourism facilities at *Tengragiri* Reserved Forest and Establishment of Riverview Eco-park in Pirojpur.

The *Nishargo* Support Projects with the financial assistance of USAID had been implemented during 2004-05 to 2008-09 to introduce sustainable co-management model for conservation of existing biodiversity and protection of natural forests for next generation. Co-management model was introduced at five protected areas (like *Lawachara* of Moulovibazar, *Rema kalenga* and *Shatchari* of Habigonj, *Chunoti* of Chittagong and *Teknaf* of Cox's bazar) under *Nishargo* Support Projects to protect natural forest with the involvement of local community. Following the success of *Nishargo* Support Projects, the Forest department has undertaken another project named Integrated Protected Area Co-management Project with the financial assistance of USAID at 19 protected areas.

Projects Taken to Restore Natural Balance through Afforestation in *Barind* Area

Barind area of Bangladesh is different from other areas of the country. One project named *Barind* Environmental Balance Restoration through Afforestation has been implemented by Barind Multipurpose Development Authority (BMDA) under the Ministry of Environment and Forests, at a cost of Tk. 22.52 crore from July 2006 to June 2011. This project will play an important role in restoring the environmental balance.

Bangladesh National Herbarium

Bangladesh National Herbarium (BNH) is a national organisation mandated to conduct taxonomic research on the plant species of the country. One of the objectives of the organisation is to collect, identify, preserve and develop database of different kinds of plants of the entire country. It plays an important role in the conservation of biodiversity and environment. The collection of the herbarium is a national property that goes down to the posterity through generations and work as reference materials on the flora of the country.

Bangladesh National Herbarium (BNH) implemented a range of activities during FY 2010-11 which include among others Botanical Survey, Plant Identification, Developing Database of the Identified Samples, Plant Preservation, Publication of Flora of Bangladesh, Floristic Publication, and Recording of

Plant Species available in Bangladesh. In addition, a programme titled "Red Data Book of Vascular Plants of Bangladesh, Vol-2" under the revenue budget for the period from 2009-10 to 2011-12 at a cost of Tk. 0.51 crore is being implemented by this organisation. Up to February of FY 2010-11 the progress of the programme is 36 percent.

Bangladesh Forest Research Institute (BFRI)

Bangladesh Forest Research Institute (BFRI) conducts research for developing sustainable technologies to increase the productivity, efficient conservation of forest resources and utilisation of forest products. These developed technologies are being used by the end-users to increase the forest resources productivity which help in poverty reduction through increasing income generation activities. The institute provides technical assistance and support to the beneficiaries such as Forest Department (FD), Bangladesh Forest Industries Development Corporation (BFIDC), Rural Electrification Board (REB), Bangladesh Railway, different government and private organisations, NGOs, individual planters and farmers and other bodies associoated with forest research, production and management. In addition, in order to increase the productivity of forest land by improved management, BFRI is providing services to the end-users through use of sustainable technologies to reduce the gap between demand and supply of forest resources.

The training courses on some of the popular technologies of BFRI are underway to meet the need of enrichment of forest resources.

The popular technologies include:

- Easy and cost effective propagation technique for bamboo through branch cutting and tissue culture.
- Preservation technique for enhancement of service life of rural housing materials (wood, bamboo, cane, sun-grass, straw, etc.)
- Preservative treatment of bamboo materials used in betel leaf farm.
- Technique for pest and disease management of forest nurseries and plantation to ensure increased production of forest resources.
- Application of appropriate proportion of fertilizer at seedling stage of different tree species in nursery and field.
- Technique for coppices management and its rotation age to increase the productivity of fuel wood species.
- Nursery and plantation technique of important mangrove species.
- Technique for manufacturing particle board using wastages of wood and bamboo.
- Easy and cost effective planting technique for tree seedling.
- Improved extraction technique of oil from agar wood.
- Development of bamboo composite furniture.

Besides these technologies, workshop and demonstration programmes are arranged for the extension of BFRI's technologies. In addition, technical and advisory services are given to public and private organisations, NGOs and private planters for enriching forest and better utilisation of forest resources.

Natural Disaster Management

Various government and non-government organisations are working relentlessly in the field of disaster management and mitigation. The focal point for disaster management is the Disaster Management Bureau under the Ministry of Food and Disaster Management. Bangladesh Meteorological Department (BMD) is responsible for forecasting natural disasters like cyclones, droughts, storms and such other disasters. Bangladesh Space Research and Remote Sensing Organisation (SPARRSO) provide satellite images while the Flood Forecasting and Warning Centre (FFWC) of Bangladesh Water Development Board is entrusted with the responsibility of forecasting flood.

A number of institutions under different ministries such as the Directorate of Relief and Rehabilitation, Directorate General of Food, Department of Public Health Engineering, Local Government Engineering Department, Water Resources Planning Organisation and Armed Forces Division are involved in disaster management. To increase the awareness of disaster risk management, the Government has taken up programmes like media award for reporting on risk management in the newspapers and electronic media and advocacy workshop for micro-credit use in controlling disaster. Moreover, three national committees have been working to administer disaster management effectively.

Besides, the national disaster management committee, the following committees are also functioning:

- Cyclone Preparedness Programme Implementation Board (CPPIB)
- Disaster Management Training and Public Awareness Building Task Force (DMTATF)
- Focal Point Operation Coordination Group of Disaster Management (FPOCG)
- NGO Coordination Committee on Disaster Management (NGOCC)

Apart from the district disaster management committee, *Upazila* disaster management committee, union and *Pourashava* disaster management committee and city corporation disaster management committee have also been constituted at subnational levels to coordinate, review and implement disaster management activities within their area of jurisdictions.

Annual Development Programme

In FY 2010-11, a total of 39 (20 investment and 19 technical) projects have been included in the Annual Development Programme (ADP) under the Ministry of Environment and Forests with an allocation of Tk 186.41 crore agianst which Tk.182.05 crore has been disbursed.

Apart from these projects or programmes which are directly related to the development of environment and eco-system, some other line ministries, particularly the Ministry of Water Resources, Ministry of Agriculture, Ministry of Food and Disaster Management and Ministry of Fisheries and Livestock are also

involved in implementing environment related development projects. The Ministry of Agriculture has been motivating the farmers to adopt a new technique about how to use super/mega granules (*guti* urea) instead of urea, which will have a positive impact on prevention of pollution and reducing misuse of urea fertilizer.

NGO Activities for Conservation of Environment

In alliance with the Government, a good number of NGOs have been working to address environmental problems and to improve environmental system of the country since 1980s. They are also playing an important role in motivating people at the grass root level to protect environment and to take coordinated efforts in solving environmental problems. Some of the NGOs are playing commendable role in protecting environment. Included among them are: International Union for the Conservation of Nature (IUCN), Centre for Sustainable Development (CSD), Bangladesh Centre for Advanced Studies (BCAS), Environmental Conservation Management Centre, Waste Concern, Bangladesh *Paribesh Andolon* (BAPA) and Bangladesh Environmental Lawyers' Association (BELA).