CHAPTER 15

ENVIRONMENT AND DEVELOPMENT

Environment and development are inextricably linked. The state of environment is critical for the existence of living creatures as well as for non-living things to exist in the long run. The global environment has been changing gradually and it has become a serious concern for all. Climate change is posing a great threat by creating environmental imbalances which impede the process of accelerating development. The global environment is facing many threats arising from various human activities. Industrialisation, exponential population growth, tremendous increase in the number of automobiles and indiscriminate felling of trees are some such activities. Bangladesh is recognised to be the worst sufferer from the impact of global warming and climate change. The Government is, therefore, giving special emphasis on conservation of environment and development. It has undertaken integrated policies and plans to protect the country from the impact of global warming.

According to the researchers, the average global temperature has risen by 0.7 degree over the past century. Rise of the sea-level, inundation of vast coastal areas, increased number of storm/tidal surges, intrusion of saline water into farm land, loss of bio-diversity and decrease of crop production due to the change of habitats of animals and plants, are among the adverse impacts of global warming and climate change. All these have a negative impact on the socio-economic condition of the world.

World Environment Movement

The Stockholm conference on environment is a significant milestone in the world environment movement. The concept of environment was expanded in the larger areas of social, economic and political sectors through this conference held in 1972. The Stockholm conference created the opportunity for advancement in the field of environment. Following the decision of the conference, many countries of the world formed environmental institutions (Environment Agencies/Ministry) and undertook environment management related initiatives.

The International Panel on Climate Change (IPCC), coming into existence in 1988, has since been relentless in undertaking research on various issues related to changes in the global climatic conditions and arousing public opinion and awareness towards undertaking required steps in confronting potential challenges. The recent IPCC research aiming at building awareness of the world community of its actions with regard to the rate of changes that are taking place in the global environment, has been the focus of attention of all concerned. The world community is now united to take actions towards implementation of the recommendations put forward by the research report.

Heads of states of the 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.

The salient features of the Copenhagen Accord include **:**

- Global carbon emission to be reduced in order to keep the rate of increase in global temperature below 2 degree Celsius.
- A recommendation for formulation of "compulsory legal agreement" by the end of the year
- In order to build capacity of the developing nations to support the implementation of adaptation action, the developed nations shall provide adequate, dependable and sustainable financial resources, technology and training.
- Emphasis on the need for funding to support adaptation, mitigation, Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD) and technology and capacity building.

It has been mentioned that the least developed countries, small island developing states and Africa are in the most vulnerable state. For the purpose of meaningful mitigation actions and transparency on implementation, developed countries commit to a goal of jointly mobilizing US$ 100 billion a year until 2020 to address the needs of developing countries.

Several international conventions, i.e., 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 chemicals substances. Various activities are being undertaken towards implementation of the recommendations of these Conventions. Besides, Montreal Protocol has been adopted to protect the ozone layer. Actions are in progress to reduce the use of ozone depleting substances. The 3R (reduce, reuse and recycle) movement across the world for waste management has now gained prominence with the patronisation and championship of Japan

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 was signed to reduce carbon dioxide and greenhouse gas emission responsible for increasing global warming, mutating avalanche and raising sea level came into force from 16 February 2005. As of now, 137 developing countries have ratified the Kyoto protocol, including Brazil, China and India, which have not committed themselves to any obligations other than monitoring and reporting emissions. The Kyoto Protocol put**s** 36 nations under obligation to meet specific legally binding targets for reducing emissions of Green House Gases (GHG below 1990 levels). The Kyoto Protocol plays an important role for aforestation activities.

Below is a list of the change in greenhouse gas emissions (1990-2004) for countries which are parties to the Climate Change Convention as reported by the United Nations:

Table: 15.1 Change in Greenhouse Gas Emissions of Some Selected Countries

Country	Change in greenhouse gas emissions (%) (1990-2004)	EU assigned objective for 2012 (%)	Treaty obligation 2008-2012 (%)
Germany	-17%	-21%	-8%
Canada	+27%	N/A	-6%
Australia	+25%	N/A	+8%*
Spain	+49%	+15%	-8%
United States	+16%	N/A	-7%*
Norway	+10%	N/A	+1%
New Zealand	+21%	N/A	0%
France	-0.8%	0%	-8%
Greece	+27%	+25%	-8%
Ireland	+23%	+13%	-8%
Japan	+6.5%	N/A	-6%
United Kingdom	-14%	-12.5%	-8%
Portugal	+41%	+27%	-8%
EU-15	-0.8%	N/A	-8%
China*	+47%	-	-
India*	+55%	-	-

Source: http://en.wikipedia.org/wiki/Kyoto_protocol.

China and India are large contributors, but are not required to meet the numerical limitations of greenhouse gas. Kazakhstan and the US did not ratify the treaty.

Box 15.1: Developing Countries Under Global Warming Risk

Developing countries of Asia and Africa will be more affected by global warming, sea level rise; increased food shortages. Flora and fauna depletion will take place earlier than predicted. As a result, shore line countries like Bangladesh and Maldives will be facing the hazards associated with these. According to International Panel on Climate Change (IPCC) third study report, 11 percent land area of Bangladesh will be submerged if sea level rise by 45 cm. According to IPCC research, sea level will rise between 18 and 59 cm by 2100. According to Institute of Water Modeling Research report, 84 percent mangrove forest will be waterlogged if sea level rises by 32 cm. According to Bangladesh Center for Advance Studies Research, socio-economic condition and food security of Bangladesh will face threat.

This report of the United Nations says that if global temperature increases between 1.5 and 2.5 °C or 2.7 to 4.5° F one-third flora and fauna will face threat. Lives of about one billion people living in the temperate regions of Asia will also face serious threats arising out of climate changes. Rainfall pattern will change. Island States of Asia and the Pacific will be submerged; droughts in Africa and Sub-Saharan region will become more frequent and a minimum of 207 million people in Latin America, Asia and Africa will face water shortages within a decade. According to that report, temperature will increase between 1.1 and 6.4 °C with in 2100.

Clean Development Mechanism (CDM) Activities

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. As a result, both developed and developing countries may be benefited.

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 of which Composting Project at *Matuail* Dumpsite, Dhaka is being implemented.

Power Division of the Ministry of Power, Energy and Mineral Resources will distribute 120 Million Compact Fluorescent Lamp (CFL) free of cost through Dhaka Electric Supply Company Limited (DESCO). Use of these Compact Fluorescent Lamps will save 60GW electricity per day. The distribution of Compact Fluorescent Lamp (CFL) will be done under a project named Efficient Lighting Initiative of Bangladesh (ELIB) which has been approved recently.

Infrastructure Development Co. 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 upto June 2008. The number increased to 403,000 by October 2009. Target has been fixed at installing 1000,000 SHS by 2012 with the financial assistance of WB, KFW, GTZ, ADB, IDB and GOB.

CDM Executive Board has registered a number of CDM projects in FY 2009-10 (source: internet). GHG emissions from these projects are equivalent to 220 million tonnes carbon dioxide (CO_2) which will be increased to 2.5 billion tonnes at the end of the year 2012.

The Major Environmental Problems of Bangladesh

Because of its geographical location, frequencies of hazards arising from drought, flood and other natural calamities are on the increase in Bangladesh. The surface water of the country is being polluted through capricious disposal of untreated industrial effluents and municipal waste water, runoff pollution from chemical fertilizers and pesticides and oil and lubes spillage in the coastal area from the operation of sea and river ports and ship wreckages. Now in Bangladesh, presence of high-level arsenic contamination in ground water is a national problem especially at Chadpur, Shatkhira, Noakhali, Comilla, Gopalgonj and some other districts.

The quality of soil has deteriorated due to reckless use of agrochemicals, unplanned use of land, undesirable encroachment on forest areas for agriculture and settlements and indiscriminate disposal of

hazardous industrial wastes. Unplanned land use and intrusion of saline water are causing degradation of soil in the coastal area.

Bangladesh, a low-riparian country, has 57 trans-boundary rivers, of which 54 are shared with India and 3 with Myanmar. A significant quantity of water flow is withdrawn and diverted upstream by neighbouring countries for irrigation and other purposes resulting in reduced flow of water in the rivers. The Farakka Barrage on the river Ganges is a notable example. Desertification prevails in some areas of Bangladesh due to withdrawal of water from the Ganges through the Farakka Barrage.

Air pollution is one of the man-made environmental disasters that is creating environmental hazard all over the world. There are two major sources of air pollution in Bangladesh namely, vehicular emissions and industrial emissions, which are mainly concentrated in the cities. There are also numerous brick-making kilns working in dry season all over Bangladesh. These kilns are another source of air pollution. An emerging issue of great concern in the cities and towns is the high concentration of lead in the air from vehicular exhausts. The high level of concentration of lead is very harmful for human health especially for child health.

The depletion of biodiversity is the result of various kinds of human interventions that impinge on it through destruction and degradation of land, forest and aquatic habitats. These activities encompass the sectors of agriculture, forestry, fisheries, urbanisation, industry, transport, tourism, energy, chemicals and minerals. In the fisheries sector, unplanned shrimp cultivation has negative impact on environment.

The Government Initiatives to Address Environmental Protection and Development

Set out below are the initiatives taken by the government to address environmental problems:

Preparation of National Land Policy

Optimum use of land and water depends on planned use of land, water resources and natural environment which are the important sources of growth. It is possible to ensure optimum use of scarce land resources by way of integrating the uses of these three natural resources. With this end in view, the Government has approved ‘National Land Use Policy, Bangladesh’. The Government has adopted various other national policies and measures to prevent land depletion. These include ‘The National Environment Policy’, ‘National Environment Act and Rules’, ‘National Forestry Policy’ and ‘The National Plan for Agricultural Research’.

National Water Policy

Water resource is of immense importance for socio-economic development of the nation. Bangladesh is endowed with a good number of water bodies scattered all over the country. Regional cooperation is indispensable for water management and protection of water resources and rational use of water. In accordance with election pledge, government is taking initiative to formulate a coordinated water policy involving Bangladesh, India, Nepal and Bhutan and to establish regional water security for tackling the

prevailing water crisis so as to ensure water resource conservation, Bangladesh's share and proper use in future. The present government is making the 'National Water policy' formulated in 1999, effective after reviewing it. An agreement on Ganges water sharing was concluded with India in 1997. According to the agreement, Ganges water available at *Farrakha* is being distributed between two countries through joint review team for the period of 1 January to 31 May in every year's dry season. In accordance with the article-IV of the said agreement, an India-Bangladesh Joint Committee was formulated for implementing and monitoring of the flow distribution measures at *Farakkah* and near Hardinge Bridge. An all out effort has been continuing for formulating water sharing agreement for rest of the 53 rivers, especially for relatively important *Tista, Dhorla, Dud Kumar, Monu, Khoai, Gomuti* and *Muhuri* rivers on a priority basis.

India-Bangladesh Water Resources Secretary level meetings were held in Dhaka on 4-5 January, 2010 to discuss on various issues related to water resources. In these meetings a decision was made to implement the protection works of banks of the bordered/common rivers flowing through India and Bangladesh which was postponed for long. Besides, two parties agreed to carry out dredging work for mitigating water logging in common 20 km areas of *Ichamoti* river**.** According to the decision of the said meetings, three technical level meetings were held between Bangladesh and India in December, 2009 and February, 2010 at Dhaka and Kolkata respectively. During these meetings, issues relating to sharing of water of *Tista* river were discussed. Besides, action plan for next 3 years was prepared providing data and information on the construction works related to the protection of the riversides of common rivers adjoining the borders of the two countries. Since 1972 there has been an arrangement between the two countries to provide data from India related to flood forecasting and warning for rivers adjacent to borders and common rivers . Under this arrangement, Bangladesh is provided with reliable flood forecast data for the central region of Bangladesh at least 72 hours before the occurrence of flood. .

The projects proposed in the national water management plan will be implemented based on priority. Quite a few projects have been taken up to transform the haor areas, inhabited by 20 million people, from a jeopardized state into a wealthy advanced locality. In accordance with the decision of Bangladesh Haor and Wetland Development Board and National Water Resource Council, a reconstituted survey/study project has been approved by the Government in December, 2009 for preparing a coordinated master plan for the development and protection of haor areas of the country's north-eastern region. This project, with an estimated cost of Tk. 739.48 lakh will be completed in June, 2011. A project titled Flood Risk Prevention Project in haor and Wetland Areas (1st phase) at an estimated cost of Tk. 751.43 lakh is being implemented to protect clustered village situated at haor during rainy season.

WARPO maintains a National Water Resources Database (NWRD) established at WARPO under NWMP project that is preserved in digital format and disseminate information/data of country's water sector including information/data of other related sectors. Besides the data collected, many important data analysis tools, models and analyzed information are incorporated in this database.. Different organisations, universities use data of NWRD in their planning and research works. Currently, updating

and upgrading of NWRD are being carried out under Water Management Improvement Project (WMIP). A 5-tier web-enabling database has been created for coastal zones.

Air Pollution Control

The Department of Environment is implementing a number of projects to control air pollution. There has been a ban on the plying of two stroke three-wheelers in Dhaka city since January 2003. Instead, environment friendly 4-stroke three-wheelers were introduced.

Five Continuous Air-quality Monitoring Stations (CAMS) have been set up in the country under Air Quality Management Project (AQMP) being implemented by the Department of Environment with financial assistance from the World Bank. Two of such CAMS are located in the city of Dhaka, while of the remaining three, one each in the cities of Chittagong, Rajshahi and Khulna. Besides, two mobile Air-Quality Monitoring Stations have also been procured for measuring air pollution at localized areas. The Clean Air Sustainable Environment (CASE) project being implemented by the Department of Environment has two main components: (a) environment – emissions from brick fields is included in this component. Department of Environment is implementing this component and (b) 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 are: (a) capacity building for implementing Sustainable Environmental Initiative (SEI) in transport and brick industry, (b) reduction of emission from brick industry, (c) mitigating acute traffic congestion in Dhaka, (d) introduction of Bus Rapid Transit (BRT) at the capital city under the Government's Strategic Transport Plan (STP) and (e) reduction of emission from vehicles.

A project titled Air Quality Improvement Through Clean Fuels and Vehicles is being implemented with the financial assistance from UNEP. According to the recommendations of a meeting titled Fourth Global Partnership Meeting for Clean Fuels and Vehicles held under the auspices of United Nations Environment Programme, 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 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.

Publicity materials have been prepared for print and electronic media towards creating mass-awareness in checking air pollution. For public awareness, a web site has been launched to provide information about

air pollution (www.doe-bd.org). 'Schedule-2' of Environment Conservation Rules 1997 has been amended to replace the air quality range

Control of Pollution from Brick Kilns

To contain air pollution, environment-friendly 'Block Bricks' are encouraged instead of traditional bricks. Attempts have been made for demonstration and publicity of environment-friendly brick-burning technologies under the project titled Clean Air Sustainable Environment (CASE) being implemented by the Department of Environment. Besides, steps are also underway towards implementing the decision to ban conventional brickfields by 2010.

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. This project was undertaken 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. Such type of information is very important to prepare strategy for controlling industrial pollution.

Control of Noise Pollution

As per the provision of the existing Environment Conservation Act 1995 which has set limit on noise pollution, the Government has framed the Noise Pollution Control Rules 2006. Under these rules, it will be easier for the Government to control noise pollution particularly the use of loud speakers. The Ministry of Environment and Forest has set a target of reducing the noise pollution level of Dhaka City to 45-55 decibel from 90-110 decibel by FY 2009-10. Recently Dhaka Metropolitan Police (DMP) has prohibited the use of horns on several city streets to check sound pollution.

Conservation of Biodiversity

Biodiversity plays a vital role in conservation of environment. There is a focus on biodiversity in the forest and environment policy. Under the Bangladesh Wildlife Preservation Act, 1974 (amended upto

1994), three categories of protected areas have been identified as national parks and wildlife sanctuaries. With an aim to conserving the biodiversity, preserving and developing natural environment and eco-tourism (environment friendly tourism) and facilitating research, the Government has declared 19 protected areas in different parts of the country. Moreover, the Government has declared 8 areas viz. Cox's Bazar, *Teknaf* Sea Beach, St. Martin's Island, *Sonadia* Island, *Sundarban* reserve forests, Gulshan-Baridhara Lake, *Hakaluki Haor*, *Tanguar Haor* and *Marjat Baor* as Ecologically Critical Area (ECA) under Environmental Conservation Act, 1995. According to Ramsar Convention, the Government has undertaken major development activities to conserve the biodiversities of wetlands including Tanguar Haor. Besides, considering the importance of *Sundarban* as the single largest mangrove forest in the world, UNESCO declared it as a World Heritage Site 0n 6 December, 1997.

The Department of Environment with the assistance of Global Environmental Facilities (GEF) and UNDP is implementing a project titled Coastal and Wetland Biodiversity Management to conserve biological diversities in the areas of *Teknaf*, St. Martins Island, *Sonadia* Island and *Hakaluki Haor*. Coordination Committees have been established at district, upazila and union levels in order to involve all classes of people in bio-diversity conservation activities. 72 Village Conservation Groups (VCGs) have been formed to bring the general public and poorer people under environmental programmes. With a view to assisting the poorer people in generating income, each VCG group has been given Tk. one lakh as the seed-money. Community based nurseries for the protection of bio-diversity and sanctuaries for fish and wild animals have been established in the project areas. Because of the initiatives undertaken by the Ministry of Environment and Forest, bio-diversities of these areas have been enriched remarkably and migratory birds have started returning at different *haors* following banning of hunting, wetland plantation and setting up of bird sanctuaries..

Climate Change and state of Vulnerability of Bangladesh

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

The average global temperature has risen by 0.6 degrees Celsius over mid- 18th century and its impact is spreading all over the world. 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.

According to the Intergovernmental Panel on Climate Change (IPCC), the principal cause of climate change is the increase in global average temperatures. 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 aggravated this vulnerability.

The following changes have been observed in climate trends, variability and extreme events :

- In Bangladesh, average temperature has registered an increasing trend of about 1°C in May and 0.5°C in November during the period from 1985 to 1998.
- The annual mean rainfall exhibits increasing trends in Bangladesh..
- Serious and recurring floods have taken place in 2002, 2003, and 2004.
- Frequency and intensity of cyclones originating from the Bay of Bengal have been increased.
- Increased salinity in the soil has damaged 0.83 Million hectare of cultivable land. Saline water from the Bay of Bengal is reported to have penetrated 100 km or more inland along tributary channels during the dry season.

Bangladesh is one of the signatories of United Nations Framework Convention on Climate Change (UNFCCC), and Kyoto Protocol. Bangladesh signed and ratified these Conventions in 1992 and 1994 respectively. Bangladesh prepared and submitted National Adaptation Programme of Action (NAPA) in 2005 as a step towards implementing the decisions adopted by the Conference of the Parties to UNFCCC. Bangladesh presented NAPA in the sidelines of the eleventh conference of parties (CoP-11) held in Montreal, Canada, during November-December 2005. The NAPA of Bangladesh earned appreciation from all quarters. Ministry of Environment and Forests also updated the NAPA document in 2009 as it felt necessary to do so.

Formulation of Second National Communication is now in progress with the support of GEF-UNDP in accordance with the provisions of UNFCC. GHG inventory, initiatives undertaken and to be undertaken will be identified under 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 aforestation project titled Community-Based Adaptation to Climate Change is being implemented by the Department of Forest with the financial assistance from LDC fund. United Nations Framework Convention on Climate Change (UNFCCC) has also established Adaptation Fund. Bangladesh has been selected as an alternate member of the 16-member Adaptation Fund Board for the least developed countries group. Developing countries, hopefully, will receive the maximum financial assistance from the adaptation fund in addressing climate change issues.

With a view to addressing the adverse impact of climate change, a Multi Donor Trust Fund (MDTF) has been established following the international conference titled “U.K. Bangladesh Climate Change Conference: Bangladesh Facing the Challenge” held in London on 10 September 2008. Formation of the MDTF which is recommended to prevent massive environment related disasters and losses, is

progressing. With the financial assistance from GEF-UNDP, a Climate Cell has been created in the Department of Environment to take up coordinated strategy at the local and national levels about climate change related activities under comprehensive disaster management programmes. The cell has completed 12 researches on adaptation so far. The Website of the cell has been uploaded with different publications / modeling related to climate change.

The Government is aware of the fact that Bangladesh is at the risk of being the worst victim of worldwide climate change. As a result, a Climate Change Strategy and Action Plan (BCCSAP) 2009 has been prepared, a Climate Change Trust Fund Policy has been formulated and a Climate Trust Fund has been established. 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. Ministry of Environment and Forest has also set up a Climate Change Unit also in order to streamline and coordinate overall climate change activities. Besides, the process of establishing 21 offices of the Department of Environment at the district level is in progress. The Climate Change Fund, constituted with the Government's own resources, has been approved by the cabinet in principle. In FY 2009-10, Tk 700 Crore has been allocated to finance 134 programmes in forty-four broad programmes under six thematic areas which are mentioned below :

1) Food security, social protection and health to ensure that the poorest and the most vulnerable in the society, including women and children, are protected from climate change and that all programmes focus on the needs of this group for food security, safe housing, employment and access to basic services, including health.

2) Comprehensive disaster management to further strengthen the country's already proven disaster management capabilities to deal with increasingly frequent and severe natural calamities.

3) Infrastructure to ensure that existing assets (e.g., coastal and river embankments) are well-maintained and fit-for-purpose and that urgently needed infrastructure (e.g. cyclone shelters and urban drainage) is put in place to deal with the likely impacts of climate change.

4) Research and knowledge management to predict the likely scale and timing of climate change impacts on different sectors of the economy and socio-economic groups; to underpin future investment strategies; and to ensure that Bangladesh is networked into the latest global thinking on climate science; and best practices of climate change management.

5) Mitigation and low carbon development to evolve low carbon development options and implement them as the country's economy grows over the coming decades and the demand for energy increases.

6) Capacity building and institutional strengthening to enhance the capacity of government ministries and agencies, civil society and the private sector to meet the challenge of climate change and mainstream them as part of development actions.

Forty-four programmes under six thematic areas mentioned above are listed below:

Theme 1: Food Security, Social Protection and Health

P1. Institutional capacity for research towards climate resilient cultivations and their dissemination

P2. Development of climate resilient cropping systems

P3. Adaptation against drought

P4. Adaptation in fisheries sector

P5. Adaptation in livestock sector

P6. Adaptation in health sector

P7. Water and sanitation programme in climate vulnerable areas

P8. Livelihood protection in ecologically fragile areas

P9. Livelihood protection of vulnerable socio-economic groups (including women)

Theme 2: Comprehensive Disaster Management

P1. Improvement of flood forecasting and early warning

P2. Improvement of cyclone and storm surge warning

P3. Awareness raising and public education towards climate resilience

P4 Risk management against loss on income and property

Theme 3: Infrastructure

P1. Repair and maintenance of existing flood embankments

P2. Repair and maintenance of cyclone shelters

P3. Repair and maintenance of existing coastal polders

P4. Improvement of urban drainage

P5. Adaptation against Floods

P6. Adaptation against tropical cyclones and storm surges

P7. Planning and design of river training works

P8. Planning, design and implementation of resuscitation of river and canals through dredging and de-siltation work

Theme 4: Research and Knowledge Management

P1. Establishment of a centre for knowledge management and training on climate change

P2. Climate change modeling at national and sub-national levels

P3. Preparatory studies for adaptation against sea level rise

P4. Monitoring of ecosystem and biodiversity changes and their impacts

P5. Macroeconomic and sectoral economic impacts of climate change

P6. Monitoring of internal and external migration of adversely impacted population and providing support to them through capacity building for their rehabilitation in new environment

P7. Monitoring of impact on various issues related to management of tourism in Bangladesh and implementation in priority action plan

Theme 5: Mitigation and Low Carbon Development

P1. Improved energy efficiency in production and consumption of energy
P2. Gas exploration and reservoir management
P3. Development of coal mines and coal fired power stations
P4. Renewable energy development
P5. Lower emission from agricultural land
P6. Management of urban waste
P7. Afforestation and reforestation programme
P8. Rapid expansion of energy saving devices, e.g. Compact Fluorescent Lamps (CFL)
P9. Energy and water efficiency in built environment
P10. Improvement in energy consumption pattern in transport sector and options for mitigation

Theme 6: Capacity Building and Institutional Strengthening

P1. Revision of sectoral policies for climate resilience
P2. Main-streaming climate change in national, sectoral and spatial development programmes
P3. Strengthening human resource capacity
P4. Strengthening gender consideration in climate change management
P4. Strengthening institutional capacity for climate change management
P5. Main-streaming climate change in the media

The above 44 identified programmes are expected to assist in combating climate change in future.

Against the allocated fund mentioned above, thirty-four projects have already been undertaken with the approval of the Trustee Board and a number of projects are under process. Sub-Committees have been formed for each of the Six Thematic areas of BCCSAP. A 12-member Technical Committee under the chairmanship of the Secretary, Ministry of Environment and Forest has been formed in order to scrutinize the projects/programmes recommended by sub-committees. A 17-member Trustee Board under the chairmanship of the Hon'ble Minister/State Minister of the same ministry has been formed in order to scrutinize/approve the projects/programmes recommended by the Technical Committee. Department of Forest has undertaken 2 projects on production of seedlings with financial support of the Trustee Board in order to implement afforestation on the embankments of Water Development Board and in areas adjacent to the embankments with the view to combating climate changes. Ministry of Shipping has undertaken a project costing Tk 22.43 crore with the financial support of Climate Change Trust Fund in order to remove polythene and other wastes accumulated in the *Buriganga* and *Turag* rivers.

Important meetings and negotiations on climate change under UNFCCC/Kyoto Protocol are being held in the different parts of the world. Important decisions on steps to be undertaken to address impact of climate change risk and mitigation activities have been taken in meetings of Conference of the Parties 15 (COP-15) held at Copenhagen, Denmark in December 2009. Bangladesh actively participated in these international conferences and meetings held so far and this has been widely recognised and appreciated by international communities. Bangladesh was elected in several international bodies under UNFCCC/Kyoto Protocol including Adaptation Fund Board. In the 15th Conference of Parties (COP 15)

to UNFCCC at Copenhagen, Bangladesh played significant as well as constructive role in different formal and informal sessions, meetings, side events, media briefings, and above all in developing and finalising the "Copenhagen Accord'' as a member of the core group of countries. Bangladesh continues her efforts to earn a significant share of the fund of US$ 30 billion for 2010-2012 created under the Accord.

Protection of Ozone Layer

Bangladesh has achieved remarkable success in protecting ozone layer. By now, Ozone Depleting Substances (ODS) have been phased out from aerosol sector in Bangladesh. As a result, 60 percent use of ODS has been reduced in the country. Besides, in the refrigeration sector, industry-owners and technicians have been provided with necessary equipment and machineries. As many as 2000 technicians have been trained on recovery and recycling towards checking unnecessary emission of Chloro-Fluro Carbon (CFCs). In order to prevent smuggling of Ozone Depleting Substances (ODS), 5 ODS Identifiers have been supplied in the customs entry points. As many as 100 customs officials and concerned officers of the law enforcing departments have been trained on prevention of import and smuggling of Ozone Depleting Substances (ODS). It may be mentioned that a plan is being implemented towards 100 percent reduction of CFC-use in the form of CFC-12 in Refrigeration and Air-conditioning Sector by 30 June, 2012 through the implementation of the project, titled "Ozone Depleting Substances (ODS) Phased Out Plan- UNDP Component" with the financial assistance of Multilateral Fund/UNDP with a view to complying with the Montreal Protocol. Ozone Depleting Substances (Regulation) Rules, 2004 has been framed under which import and use of ODSs are being controlled through licensing systems.

Second National Communication (SNC) Project of Bangladesh

The implementation of the SNC project (March, 2008-August, 2010) is underway. The main objective of this project is to prepare a report as a part of Bangladesh government's voluntary obligation. Main activities of the project are as follows :

- Prepare National Circumstances
- Prepare Green House Gas Inventory
- Determine different techniques and methods for green house gas emission prevention through Programme Containing Measures to Mitigate Climate Change
- Determine different technique and methods for increasing capacity of the country through Programme Containing Measures to Facilitate Adaptation to Climate Change.
- Provide directives through programme and plans relevant to achievement of the objectives of the UNFCCC.

In order to implement the five functions mentioned above, two agencies have been appointed

Biodiversity Targets National Assessment Project.

The implementation of the project titled Biodiversity Targets National Assessment began in April, 2009 which is scheduled to be completed in August, 2010. The main objective of this project is to prepare the fourth periodic report on the implementation status of the UN Convention on Biodiversity (CBD).

Development of the National Bio-safety Framework

The Department of Environment is implementing development of the national bio-safety framework project with the financial assistance from Global Environment Facility (GEF).

Publication of Dhaka City State of Environment Report

The DOE has published the report titled "Dhaka City State of Environment" with the financial assistance from UNEP. Besides, a report on Bangladesh National Programme of Action for protection of the coastal and marine environment from land based activities have been published.

Steps Taken for Management of Hospital/Clinical Waste

The pressure of huge population increases the amount of household and other wastes. Waste management plans to reduce, reuse and recycle of wastes are being implemented throughout the world. Besides, the Government's pledge as set out in its vision document is to prevent air, industrial and vehicle pollutions in a planned way and to ensure scientific disposal of wastes. For environment-friendly management of Hospitals' Clinical wastes in Dhaka city, the DOE and Bangladesh Private Clinic and Diagnostic Owner's association are working closely. By now, many hospitals and clinics in Dhaka city have developed management system of waste disposal by receiving consultancy support from DoE. 133 upazila health complexes have been included for smooth disposal system of clinical waste. Besides, waste management committees at district and upazilla levels have been formed. In compliance with the Environment Conservation Act, framing of draft Clinical Waste Management and Operation Rules and Guidelines-2010 and Solid Waste management and Handling Rules, 2010 are underway.

The Government has taken an initiative to produce energy and fertilizer from waste. With the support from JICA, the Dhaka City Corporation has undertaken a 20- year master plan for waste management. Technical assistance has been provided to DCC for taking CDM projects. With the financial assistance from UNCRD, DOE is implementing a project titled National Strategy on Waste Reduce, Reuse and Recycle. Preparation of 3R strategy is in progress.

DoE has set up a pilot composting plant under Kustia Municipality with the assistance from JICA.

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) provides 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 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:

(a) Cyclone Preparedness Programme Implementation Board (CPPIB)

(b) Disaster Management Training and Public Awareness Building Task Force (DMTATF)

(c) Focal Point Operation Coordination Group of Disaster Management (FPOCG)

(d) 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 sub national levels to coordinate, review and implement disaster management activities within their area of jurisdictions.

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. The NGOs play an important role in motivating people at the grass root level to protect environment and to take coordinated efforts in solving environmental problems. There are NGOs which are playing commendable role in projecting 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).

The Department of Forest

The Forest Department plays an important role in the development of physical, socio-economic development, maintenance of environmental balance and sustainable land based production system.

The total area of Bangladesh is 14.757 million hectares, of which 2.52 million hectares is forestland corresponding to 17.08 percent of the total area of the country. Out of 2.52 million hectares of forestland, 1.52 million hectares (10.30 percent are government forests, 0.73 million hectares (4.95 percent) are unclassified state forests and 0.27 million hectares (1.83 percent) are village forests. A total of 1.52 hectares of government forestlands are managed by Forest Department and unclassified state forests of Chittagong Hill Tracts are under the control of district administration. The forest management system of

Bangladesh is an age-old system. At the beginning, the main task of the forest department was to protect the forest and to ensure sustainable yield management. .

The present Government has taken up a plan to bring 20 percent of our land under afforestation programmes by 2015 to attain self-sufficiency in forest resources and maintain ecological balance. Forest Department has been working hard to achieve this target. Forest Department has taken necessary steps to establish wildlife safari park named “Bangabandhu Safari Park, Gazipur” near Dhaka and “Sheikh Russel Aviary Park” at Rangunia, Chittagong in FY 2009-10 financial year. Recently, the Department of Forest has started its construction work to establish a new wildlife sanctuary covering an area of 4716.57 hectares at Khurusia and Dohazari Range as part of forest biodiversity and natural conservation under IPAC Project. This wildlife sanctuary has been named as “Dudpukuria-Dhopachan Wildlife Sanctuary”. Besides, the Department of Forest has declared another three reserved forests as new protected areas to conserve biodiversity and develop ecotourism in the country. It has initiated a project titled Suandarbans Environmental and Livelihood Securities at the cost of Tk. 149.66 crore with the financial support of European Union. This project is scheduled to start from October, 2010 and planned to be completed in December, 2014. To conserve the forest resources in the country, a process to amend the old Forest Act of 1927 has begun. Besides, the revision of Forest Products Transit Rules is under way to make easy transition of forestry produces in the country.

Important steps taken by the Department of Forest during FY 2009-10 are as follows:

• Strengthening the wildlife conservation system in the country

Updating the Wildlife Preservation Act of 1973.

• Introducing Banghabandhu National Award for wildlife conservation

• Distributing benefits from participatory social forestry among the participants involved in the Social Forestry Programme.

• Creation of Tree Farming Fund with a view to sustain the social forestry programme.

For Conservation of biodiversity, the Department of Forest has been implementing a number of development projects and programmes such as (a) Establishment of Botanical Garden and Eco-park at Sitakunda, Chittagong, (b) Establishment of Tilagarh and Barshijora Eco-parks in Greater Sylhet District, (c) Further Development of Bangabandhu Safari Park, Cox's Bazar, (d)Establishment of Dhansiri Eco-Park and Development of Ramsagar National Park including Establishing Recreation centre at Shingra, Ranisagar and Ashura Beel (e) Establishment of Eco-park at Kuakata under Kolapara Upazila (f) Biodiversity Conservation and Development in Banshkhali Upazilla and Chunati Wildlife Sanctuary, Chittagong (1st Revised), (g) Establishment of Eco-park at Madhobkunda Water Fall Area (2nd Phase-1st revised), (h) Biodiversity Conservation and Natural Environment Development of Greater Jessore District (1st Revised), (i) Establishment of Green Park at Jaflong, (j) Rehabilitation and Development of Infrastructure in the Sundarbans, (k) Enrichment of Bio-diversity and Creation of Recreation Facilities at Lalmai, Kotbari (l) Establishment of Bangabandhu Sheikh Mujib Safari Park at Gazipur and (m) Bio-diversity Conservation and Ecotourism Development of Reserved Forest at Khurusia Range under Chittagong South Division.

To introduce sustainable Co-management model for conservation of existing biodiversity and protection of remaining natural forests for future generation, a project named Nishargo Support Project has been implemented with the financial assistance of USAID from 2004-05 to 2008-09. Co-management model was introduced at five protected areas (like Lawchara of Moulovibazar, Rema kalenga & Shatchari of Hobigonj, Chunoti of Chittagong and Teknaf of Cox's bazar) under the Nishargo Support Project to protect natural forest with the involvement of local community. Depending on the success of Nishargo Support Project, the Department of Forest department has undertaken another project named Integrated Protected area Co-management Project with the financial assistance of USAID. The Co-management model will be implemented across 19 protected areas under this project.

Social Forestry

Social forestry is an important programme of the Department of Forest. Since 1981, the Department has been implementing four social projects with the financial assistance from the Asian Development Bank (ADB). The Department has targeted to establish 11401.03 hectares/5451.10 km of Strip plantation and raise 99.125 lakh seedlings under different ongoing projects.

At present, implementation of (1) Reedland Integrated Social Forestry Project (1st Revised) (2) Biodiversity Conservation and Poverty Alleviation in Greater Rajshahi and Kustia Districts Projects(3) Afforestation in the Denuded Hill Areas of Chittagong North Foest Division(2nd Phase) (4) Agar Plantation (1st Phase) (5) Participatory Social and Extension Forestry in Chittagong Hill Tracts is under way. The poor and marginal farmers are participating in different social forestry related projects/programmes and the Government has set policies in this regard.

Social forestry programme has been contributing a lot to the endeavours of reducing poverty in addition to increasing wood and fuel wood products. After joining the plantation programme, the social impediment of women empowerment has been removed largely. In FY 2008-2009, an amount of Tk 435 crore has been distributed among 2384 (1755 male and female 629) beneficiaries. To date, about 5 lakh beneficiaries have been involved with the social forestry programme.

Barind Environmental Balance Restoration Through Aforestation Project

Barind area is different from the other areas of the country. For environmental improvement of the Barind area, the Government is implementing "Barind Environmental Balance Restoration through Afforestation" project under the Ministry of Environment and Forest at a total cost of Tk. 22.52 crore. After completion of the project, it would play a positive role in maintaining environmental balance in this area and for the country.

Bangladesh National Herbarium (BNH)

Bangladesh National Herbarium is a national research organisation mandated to conduct taxonomic research on plant species of the country. One of the main objectives of National Herbarium is to identify, collect and preserve all plant species including those which are part of national tradition and culture. Some of the important activities of Bangladesh National Herbarium are stated below:

 Botanical Survey: About 1100 plant specimens have been collected in FY 2009-10 through botanical survey from the forest areas in the districts of Moulvibazar, Khagrachari and Rangamati.

 Plant Identification: Through taxonoic studies about 1000 plant species were identified by the scientists of the National Herbarium. Besides, as many as 350 plant species have been identified by different universities, government and non-government research organisations. The collected species have been preserved in the herbarium cupboard. Under the taxonomic studies carried out at the National Herbarium, 'Flora of Bangladesh' (Fascicle No.59 and 60) has been published. Moreover, Fascicle No.4, 5, 6, 7 and 60 has also been reprinted.

Apart from this, BNH is actively engaged in the implementation of the programme on the Encyclopedia of Flora and Fauna of Bangladesh sponsored and implemented by MOEF and Bangladesh Asiatic Society.

Bangladesh Forest Research Institute (BFRI)

BFRI is the only national forest research organisation of the country. The main objective of BFRI is to augment and preserve forest resources through scientific use and innovate new technologies for environmental development and poverty alleviation. The objectives also include poverty reduction and employment generation.

The technologies recently developed by BFRI include:

- Tissue culture technique for bamboo and hybrid acacia.
- Technique for important mangrove species for nursery and garden
- Intensive propagation technique for bamboo through branch cutting and tissue
- Techniques for pest and disease management of major forest nurseries and plantation to ensureincreased production of forest resources.
- Preparation of volume, bio-mass table for advanced trees and determine a model for its production and growth.
- Technique for coppice management and its rotation age to increase the productivity of fuel wood species.

Bangladesh Forest Industries Development Corporation (BFIDC)

The main objectives of BFIDC include extraction of forest produces (timber) from the forests of the country, establishment of timber based industries, rubber plantation, productions, processing and marketing and best utilisation of forest resources and processing of the extracted timber. The activities of BFIDC are divided into two sectors namely (a) Industrial sector and (b) Agriculture sector. Under BFIDC, there are three rubber zones and sixteen rubber gardens which are yielding profits for the last four to five years. In FY 2006-07, the profit amounted to Tk. 25.80 crore which rose to Tk. 32.60 crore in FY 2007-08 and Tk. 17.13 crore in FY 2008-09.

Moreover, BFIDC met about 70 percent of total demand of raw rubber of the country and provided employment opportunities for 5015 people at 16 rubber gardens consisting 62635 acres of land. Quality and standard of rubber wood as tested are very close to those of teak (Segun) wood.

A comprehensive action plan has been taken up to modernise BFIDC. Some important features of the action plan are mentioned below:

a. Formulation of National Rubber Policy;

b. Modernisation of factories and smoke-houses, creation of armed guards for rubber sector to protect theft/trafficking, infrastructure development and re-plantation.

c. Manufacturing of modern doors, windows and household wooden items to meet the local demand and market competitiveness by modernising the existing Industrial Units;

d. Alleviation of poverty of the rural poor people by expanding rubber cultivation in private/public sector especially in the hilly areas of Bangladesh and Modhupur tracts.

In FY 2009-10, BFIDC produced 5,115 metric tonns of rubber against the target of 6,513 metric tonne.

Annual Development Programme

In FY 2009-10, a total of 36 (18 investment and 18 technical) projects have been included in the Annual Development Programme (ADP) under the Ministry of Environment and Forests. During FY 2007-08, a total of Tk 84.99 crore has been allocated in the ADP of which the GOB component was Tk.38.45 crore and the project aid component Tk. 46.54 crore. The overall achievement of ADP is 26 percent. During FY 2007-08, MoEF implemented 35 development projects with RADP allocation of Tk. 71.23 crore. Besides, there are 11 development programmes financed from the revenue budget of this fiscal year with an allocation of Tk. 42.63 crore.

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 environmental 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. Moreover, activities like development of forest management, conservation of wild life, protected area management, development of national parks and development of safari parks aimed at putting in a sustainable eco-system of the country are making immense contribution towards the protection of environment.