

CHAPTER 15

ENVIRONMENT AND DEVELOPMENT

[Environment development is a crucial challenge for the bio-diversity rich Bangladesh, like other developing countries. Efforts are on to integrate issues pertaining to environment with mainstream development policies to ensure economic growth and environmental sustainability. A number of policies and development plans have been adopted and are being implemented to encounter environmental hazards and to ensure a pollution-free eco-friendly environment. Government has also adopted the 'Vision 2021' integrating environmental issues like mitigating the risks arising from global warming and climate change, environmental pollution control, water and natural resource management etc. with development activities. Bangladesh has made significant progress towards achieving the target of 'Safe drinking water supply and sanitation for all' as envisaged in the 7th goal of the MDGs set by United Nations. With a view to mitigating the risks arising from climate change, Bangladesh Climate Change Strategy and Action Plan 2009 (BCCSAP, 2009) has been established. To promote implementation of BCCSAP, the Government has established the Bangladesh Climate Change Trust Fund 2009 (BCCFT, 2009) and enacted the Climate Change Trust Act 2010. The Government allocated a total of Tk.2,700 crore for this Fund during the last three consecutive fiscal years. Moreover, a multi-donor trust fund called 'Bangladesh Climate Change Resilience Fund (BCCRF)' has been established in 2011 in order to facilitate projects taken for adaptation. As of June 2014, an amount of US\$190 million has been deposited for this fund from international development partners. The Ministry of Environment and Forest has undertaken a number of programmes to drum up mass awareness about protection of the ozone layer from depletion, the impending challenges of climate change and also the necessity of working in tandem with government. Disaster Management and Relief Division is also agile in implementing various programmes in order to tackle eventualities emanating from natural disasters. The Ministry of Water Resources too is preparing plans, acts, policies, etc. and implementing various development projects to improve water resource management and by extension, the environment. The National Work Plan-2020 has been adopted considering the great necessity of bio-diversity in maintaining ecological balance.]

Bangladesh has been bestowed with one of the richest bio-diversity of the world by virtue of its geographical location. However, environmental development remains a crucial challenge for this country like most other developing countries. Since most of the development initiatives of various sectors are heavily dependent on natural resources, their contribution to GDP is significantly influenced by sustainable environmental development. As economic development and environmental sustainability are intricately linked, it is important to integrate environment related issues with the development agenda.

International Initiatives on Protection of Environment

The concept of environmental protection as well as its development received wider global attention from the early seventies. The decision agreed upon at the UN conference on the human environment held in Stockholm in 1972 worked as an eye-opener for international communities. Following this conference several countries ventured to establish environmental agencies, formulate environmental rules/work plan and adopted the recommendations of 'Intergovernmental Panel on Climate Change (IPCC)' formulated by leading scientists of the world in 1988. Another significant international initiative on this issue was negotiations on the Kyoto Protocol signed in December 1997 under the United Nations Framework Convention on Climate Change (UNFCCC). The Kyoto Protocol was signed to reduce carbon dioxide and greenhouse gas emission.

There are 192 parties to the convention: 191 states (including all the UN members except Andorra, South Sudan, Canada and the United States) and a European regional economic integration organization. As part of the Kyoto Protocol, many developed countries have agreed to legally binding limitations/reductions in their emissions of greenhouse gases in two commitment periods. The first commitment period applies to emissions between 2008-2012, and the second commitment period applies to emissions between 2013-2020. The protocol was amended in 2012 to accommodate the second commitment period, but this amendment has (as of January 2013) not entered into legal force. Bangladesh has already accepted the second commitment period. It is to be noted that the developed countries which signed the Kyoto Protocol are responsible for global warming by emitting 27 percent greenhouse gas (GHG). But Russia, Japan and Canada declared to dissociate themselves from the Kyoto Protocol. In this context, global warming by the concerned countries of this protocol has been declined to 17 percent. It should be noted here that more than 58 percent of total global GHG emission is emitted by only five countries (China, United States, Russia, India and Japan). Set out below is a list of some selected countries (Table: 15.1) showing the level of their greenhouse gas emissions:

Table: 15.1 Greenhouse Gas Emissions of Some Selected Countries

S.L	Country	Annual CO ₂ Emissions in 2011 (In millions of metric tonnes)	% of Global Total in 2011
1	China	8,715.30	26.75
2	United States	5,490.63	16.85
3	Russia	1,788.13	5.48
4	India	1,725.76	5.29
5	Japan	1,180.61	3.62
6	Germany	748.48	2.29
7	Iran	624.85	1.91
8	South Korea	610.95	1.87
9	Canada	552.55	1.69
10	Saudi Arabia	513.52	1.57

Source: EIA (Energy Information Administration), 2014

Furthermore, 194 countries, numerous environmentalist organizations and experts signed an agreement known as the ‘Copenhagen Accord’ at a ‘Conference on Climate Change’ held in December, 2009 in Copenhagen, the capital of Denmark. In this conference, a recommendation was adopted for formulation of ‘compulsory legal agreement’ with an understanding that the global carbon emission be reduced to keep the rate of increase in global temperature below 2 degree Celsius. In 2011, at Conference of the Parties- 17 (COP-17), parties adopted the ‘Durban Platform for Enhanced Action’. As part of the Durban Platform, parties have agreed to ‘develop a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties’. This new treaty is due to be adopted at the COP-21 (scheduled to be held in 2015), and implemented in 2020. Considering the vulnerability of the least developed countries, the developed countries had committed to jointly mobilise US\$100 billion per year until 2020 to address their needs.

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 the UN. The main issues associated with this goal are integration of the principles of sustainable development with state policies and principles and amelioration of the loss of natural environment and bio-diversity. According to a report titled “Millennium Development Goals: Bangladesh Progress Report 2013” published jointly by UN Development Program and Bangladesh Government, Bangladesh has already made a remarkable progress towards achieving the target of “Ensuring availability of safe drinking water and sanitary latrines” as enunciated in goal-7 of the MDG. The following table shows the achievements made in goal-7 of the MDG

Table 15.2: Environment Related Progress in Achieving Millennium Development Goals

No.	Objective Aims and Indicators	Base Year 1991	Current Status	Target by 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	13.20 (DoF 2013) (Tree Density > 30%)	20.0 (Density > 70%)
7.2	CO ₂ emission (metric tonnes per capita)	0.14	0.31 (DoE, 2013)	-
7.3	Consumption of ozone-depleting Substance (ODP tons)	72.6 ODP tones (HCFC: Hydro chlorofluorocarbon)	66.47 ODP tons (DoE, 2012)	65.39 ODP tons
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	Tere: 1.83% & Marine 0.47 (DoF 2013)	5.0
7.7	Proportions of species threatened with extinction		106 (2001)	
7.8	Proportion of population using an improved drinking water sources	78	97.9 (MICS 2013) 98.2 (SVRS 2011)	100
7.9	Proportion of population using an improved sanitation facility	39	55.9 (MICS 2013) 63.6 (SVRS 2011)	100
7.10	Proportion of urban population living in slums	-	7.8 (BBS 2001)	-

Source: Millennium Development Goals Bangladesh Progress Report 2013; GED, Planning Commission and UNDP.

Bangladesh's Submission for Post 2015 Sustainable Development Agenda to UN

Bangladesh had played a pivotal role in Rio+20 conference negotiation process in order to initiate a country driven post 2015 development agenda as a decision in the Rio+20 Outcome Document 'The Future We Want'. Thereafter Bangladesh's proposal on Post 2015 Development Agenda was finalised that contains 11 goals, 58 targets and 241 indicators. Bangladesh has submitted her proposal to the UNGA for due consideration in June 2013.

The following environmental and climate change related proposal (Post-2015 Development Agenda) was made to implement for the period 2016-2030:

Goal 10: *Ensure environmental sustainability and disaster management.* It has been proposed to integrate DRR and climate change adaptation as part of the core components of sustainable development, increase the resilience of communities, and encourage regional and global cooperation for disaster forecasting and reduction and managing post disaster situation. On the environmental side, a comprehensive perspective linked to the use of land, water, agriculture, forest, urban environmental conditions, and energy has been suggested.

- GED, Planning Commission; "Post 2015 Development Agenda: Bangladesh Proposal to UN".

Climate Change and Bangladesh:

One of the most significant impacts of climate change is the rise of sea-level. The sea-level has risen by 17 to 21 centimeters over the past century. Bangladesh is precariously exposed to the adverse impacts of climate change for being located on the sea-shore. A recent survey and evaluation suggest that impacts of climate change have reduced Bangladesh to one of the most vulnerable and risk-prone countries in world. Poverty and excessive reliance on the natural resources has intensified this vulnerability. Floods, drought, cyclone, salinity and the rise of sea level are impeding economic growth.

Recently, the following changes have occurred in Bangladesh due to climate change:

- Saline water from the Bay of Bengal is reported to have penetrated an area of 100 km or more along tributary channels during the dry season;
- Annual mean rainfall shows increasing trends. High rainfall causes water logging, especially in cities;
- Serious floods occurred place in 2002, 2003 and 2004 ;
- Serious damages occurred by *SIDR* in 2007 and *AILA* in 2009 in the coastal areas;
- Frequency and intensity of cyclones originating from the Bay of Bengal have increased. Unpredictable and rough sea adversely affects the livelihood of fishermen.

Adaptation and Mitigation

The government has established the Climate Change Trust Fund with an allocation of Tk. 700 crore from domestic sources in FY 2009-10 to combat the risks of climate change and accelerate adaptation activities. Over the last three consecutive fiscal years, the Government allocated a total

of Tk. 2,700 crore for this fund. The main objective of this fund is to implement the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009 of the Climate Change Trust Act 2010, stipulates that 66 percent of the allocated fund has to be spent for implementing approved projects and a minimum of 34 percent have to be kept as fixed deposit. In compliance of the law, Tk. 1,155.00 crore is fixed deposited as FDR in different banks. A total of 270 projects (207 projects by government agency and 63 projects by NGOs) are now being implemented (up to June 2014) using the resources from this fund.

The Department of Environment has taken up the following projects for implementation under the Trust Fund:

- Waste Reduce, Reuse and Recycle (3R) Initiative in *Gulshan*, *Baridhara* and *Dhanmondi* areas of Dhaka and *Nasirabad* and *Khulshi* areas of Chittagong cities;
- Programmatic CDM through utilisation of waste in all towns (Municipalities) of Bangladesh;
- Community Based Adaptation in the Ecologically Critical Areas through Biodiversity Conservation and Social Protection;
- Modernisation and Extension of Chittagong Divisional Laboratory of Department of Environment to strengthen the monitoring and assessment system due to the adverse impact of climate change;
- Environment Friendly Management of Poly-Packaging Waste to reduce water logging and adverse impact of Climate Change.

Beside these, a multi-donor trust fund called ‘Bangladesh Climate Change Resilience Fund (BCCRF)’ has been established in 2011 in order to facilitate projects taken for adaptation. As of June 2014, an amount of US\$190 million has been deposited for this fund from international development partners. Under the BCCRF, six projects by different ministry/division/directorate are as follows:

- Establishment of Multipurpose Cyclone Shelter in the coastal area which is governed by the Ministry of Local Government, Rural Development and Co-operatives;
- Bangladesh Modern Food Storage Facilities project which is governed by the Ministry of Food and Disaster Management;
- Solar Irrigation Program-A Green Energy Initiative project which is governed by Infrastructure Development Company Limited (IDCL), Ministry of power;
- Agricultural Adaptation in Climate Risk Prone (drought, flood and saline prone areas) Areas of Bangladesh (under preparation) project which is governed by the Department of Agriculture Extension (DAE), Food and Agriculture Organization (FAO) of the United Nations;
- Community Climate Change project which is governed by *Palli Karma Shahayak* Foundation (PKSF);
- Climate Resilient Participatory Afforestation and Reforestation project which is governed by the Bangladesh Forest Department.

Being a country exposed to the vulnerabilities of climate change, Bangladesh has been playing active roles in international forums. In the conference of Climate Vulnerable Forum, constituted with 11 most affected countries due to climate change, held in Dhaka from 13-14 November, 2011 and in the Bhutan Climate Summit for a Living Himalayas, Bangladesh had strongly argued her case.

The Department of Environment has taken a project with the assistance from Danish Embassy and a Danish non-government organisation to formulate a Nationally Appropriate Mitigation Action (NAMA) for steel sector to keep the discharge of greenhouse gas from steel industry at acceptable level.

The Ministry of Environment and Forest has signed Bilateral Offset Credit Mechanism (BOCM) contract with the Government of Japan. It is expected that Japan will finance in 'Power Generation with energy efficient Combined Cycle Gas Turbine (CCGT)' of Bangladesh so that the emission of carbon dioxide is reduced to half.

The Directorate of Environment has prepared Second National Communication (SNC) and submitted it to UNFCCC secretariat. Under the SNC, besides other activities, future action plans for adaptation and mitigation are adopted.

The Government has withdrawn tax on Solar Home System to encourage its increased use. Approximately 9 lakh Improved Cook Stoves is distributed to households in an attempt to reduce the demand of wood as fuel which and thereby to save trees from wanton destruction.

The Government has decided to convert the numerous existing traditional brick kilns into fuel saving improved technology to reduce the risk of air pollution. The Government has decided not to give environmental clearance for the traditional brick kilns along with a condition that the existing traditional brick kilns must be converted to environment-friendly improved technology (like-zigzag, Hybrid Holman, vertical shaft) by June 2013.

In addition, the Department of Forest has taken a number of initiatives to tackle/address global warming due to climate change. As part of these initiatives, 8 projects are undertaken under Climate Change Trust Fund. The target of these projects is to make block garden in 2,538.33 hectares, strip garden in 54 kilometers and production of 130.00 lakh plants. Besides these, in FY 2012-13, 1,371 hectares block garden and 539 km. strip garden plantation is targeted under the *Climate Resilient Participatory Afforestation and Reforestation project* being implemented under Bangladesh Climate Change Resilient Fund.

Environmental Protection and Development

Conservation of environment remains a high priority in the government's policies and strategies. Environmental issues are now being integrated in several sectoral plans and policies. A number of programmes are taken up by the Ministry of Environment and Forests to address environmental issues and make the policies more functional.

Ozone Layer Protection

Bangladesh had signed the Montreal Protocol on 2 August, 1990 and ratified its London, Copenhagen, Montreal and Beijing amendments in 1994, 2000, 2001 and 2010 respectively. Bangladesh is enlisted in Article 5 (1) of the protocol. Guided by the condition of the protocol, use of CFC control started gradually from 1st July 1999 in 2010 it became zero level. In addition, an Ozone Cell was formed in DoE in 1996 and several other projects are on board under the financial support of the Multilateral Fund (MLF).

Activities carried out by the Department of Environment (DOE) for the last seven years to protect the Ozone Layer are as follows:

- Data Collection on use and import of Ozone Depleting Substances (ODSs) each year and reporting to Ozone Secretariat;
- Observance of the 'International Ozone Day' each year to create mass awareness. Undertake and implement different projects to protect the ozone layer;
- Provide ODS import license each year to restrict ODS import;
- Organising training programme on capacity building of ODS users;
- Phase out CFC-11 and CFC-12 in manufacturing of Metered Dose Inhalers (MDIs) in pharmaceutical industry in Bangladesh. Transition Strategy project and Conversion project is being implemented with the assistance of UNEP and UNDP respectively funded by Multilateral Fund (MLF);
- Formulation of the 'HCFC Phase-out Management Plan (Stage-I)' to phase out hydro-chlorofluorocarbon (HCFC);
- Start implementation of project financed by Multilateral Fund assisted by UNDP with a view to phasing out HCFC-14 B from Foam Sector;
- Reduction of Chlorofluorocarbon (CFC) use at zero level in all sectors except pharmaceutical industry by 1st January 2010 and full phasing out of the use of Chlorofluorocarbon (CFC) in pharmaceutical industry by 2012.
- Phased-out HCFC-141b from the manufacturing of refrigerator foam as foam blowing agent on 1 January 2013. Bangladesh is the first Article 5 country to phase-out HCFC-141b from foam sector.

Control Air Pollution

For the controlling of air pollution, Department of Environment (DoE) takes necessary measures on the basis of air pollution monitoring result at different locations of the country. The department has also established 11 Continuous Air Monitoring Stations (CAMS) at various places of important cities in the country which includes *Dhaka, Chittagong, Rajshahi, Khulna, Barishal, Sylhet, Gazipur* and *Narayanganj*. Continuous air quality monitoring results are obtained from these CAMS. All these CAMS are continuously monitoring 6 pollutants which are Carbon Monoxide (CO), Oxides of Nitrogen (NO_x), Particulate Matter 10 (PM₁₀), Particulate Matter 2.5 (PM_{2.5}), Ozone (O₃) and Sulphur di Oxide (SO₂). The monitoring data generating in the

CAMS are retrieved in the central server system at DOE, *Dhaka* via online network. Based on those data, monthly monitoring report and Air Quality Index (AQI) is prepared. Moreover another Transboundary Air Quality Monitoring Station is operated at *Syamnagar of Shatkhira* district.

Table 15.3: Continuous Air Quality monitoring data average concentration of 2013 from(*Sangsad, Farmgate and Darrussalam* CAMS in Dhaka city) comparing with National Ambient Air Quality Standards for Bangladesh.

Table 15.3: Air Quality Standards of the Selected Points in Dhaka City

Pollutant	AQLimit(Environment Conservation Rule 1997)	Averaging Time	CAMS Data2013
CO	10 mg/m ³ (9 ppm)	8 hours (not to be exceeded more than once per year)	2-4 µg/m ³ (24 hr average)
	40 mg/m ³ (35 ppm)	1 hour (not to be exceeded more than once per year)	—
NO ₂	100 µg/m ³ (0.053 ppm)	Annual	35-40ppb
PM10	50 µg/m ³	Annual (the objective is attained when the annual arithmetic mean is less than or equal to 50 mg/m ³)	—
	150 µg/m ³	24 hours (the objective is attained when the expected number of days per calendar year with a 24 hour average of 150 µg/m ³ is equal to or less than 1)	50-90 µg/m ³ (24 hr average)
PM2.5	15 µg/m ³	Annual	-
	65 µg/m ³ (24 hours)	24 hours	20-65 µg/m ³ (24 hr average)
O ₃	235 µg/m ³ (0.12 ppm)	1 hour (the objective is attained when the expected number of days per calendar with the maximum hourly average of 0.12 ppm is equal to or less than 1)	—
	157 µg/m ³ (0.08 ppm)	8 hours	3-20ppb (8 hr average)
SO ₂	80 µg/m ³ (0.03 ppm)	Annual	2-30ppb (24 hr average)
	365 µg/m ³ (0.14 ppm)	24 hours (not to be exceeded more than once per year)	—

Source: Department of Environment

Aiming to improve the overall air quality of the country, Department of Environment is implementing some projects which are:

- Clean Air and Sustainable Environment (CASE), Project supported by the World Bank for the period of 2009-2016.
- Market Development initiative for *Bondhu Chula* Project supported by the GIZ and BCCTF for the period of 2012-2014.
- Bangladesh Brick Kiln Efficiency Project supported by the ADB for the period of 2013-14.

- Development/Updating of a National Roadmap for Reducing Black Carbon from Heavy Duty Diesel Vehicle and Engines, supported by the Clean Air Asia (CAA) for the period of 2013-14.
- National Action Plan (NAP) for Reducing Short-Lived Climate Pollutants (SLCP) supported by the Climate and Clean Air Coalition (CCAC) for the period of FY 2013-14

Industrial Pollution Control

The Environment Conservation Act 1995 and the Environment Conservation Rules 1997, stipulate that environment clearance certificate in favor of industries can only be issued when pollution level is within an acceptable level. Industries that cause massive pollution are given environment clearance certificates only after they establish Effluent Treatment Plant (ETP). A project titled *Survey and Mapping of Environmental Pollution from Industries in Greater Dhaka and Preparation of Strategies for its Mitigation* is being implemented by the DoE in order to determine the number of industries and the level of pollution caused by them and eventually to come up with measures to control pollution.

Industrial Pollution Control Planning

- Tannery industries situated in the residential areas of *Dhaka* will be relocated at *Savara* after establishing waste recycling plants.
- All industrial units in the country will be brought under GIS Mapping system.
- Establishment of ETP system in all and keep them operational.
- Strengthen enforcement program to free all rivers of the country from pollution.

River Water Pollution

According to the Environment Conservation Rule 1997 the water quality of the main rivers in Bangladesh such as the *Padma, Meghna, Jamuna, Korotoa, Dhaleshwari, Surma, Kushiara* are within the acceptable limit all the year round. But the water quality of the rivers flowing around the Dhaka City namely *Buriganga, Balu, Shitalakhya* and *Turag* deteriorates drastically during the dry season when the water flow is very low. At these times Dissolved Oxygen (DO) of these rivers comes virtually to a naught for which phytoplankton and zooplankton cannot grow and live. The Government has, therefore, declared the rivers like *Buriganga, Shitalaksha, Turag, Balu* and their foreshores Ecologically Critical Area (ECA) to take necessary actions to improve the ecosystem of these rivers.

DoE has been monitoring the water quality of some of the important rivers since 1973. It monitored water quality of 27 rivers at 88 points of the country in FY 2010-11. The parameters of water quality are: p^H , Chloride, Turbidity, Total Dissolved Solid (TDS), Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD).

In 2012 water quality of the major rivers such as *Padma, Meghna, Jumuna, Dhaleshwari, Surma, Korotoa*, etc, was within the limit of Environmental Quality Standards (EQS). In terms of DO, BOD and COD value rivers around Dhaka were highly polluted in the four-five months of the

year. No dissolved oxygen was found from January to May at different location of *Buriganga*, *Shitalakhya* and *Turagrivers*. High level of BOD 48 mg/l (acceptable range 6 mg/l or less) and COD 283 mg/l (acceptable range up to 200 mg/l), Chloride 133.96 mg/l, (acceptable up to 600 mg/l) TDS (432 mg/l) (acceptable range up to 2,100 mg/l) were found in *BurigangaRiver* from January to December in 2012. In *Meghna* DO level was found within the EQS which varied from 5.2 to 7.2 mg/l (acceptable range 5 mg/l or more) and BOD from 0.3 to 3.4 mg/l (acceptable range 6 mg/l or less). In *Jamuna* DO level was found within the EQS which varied from 5.9 to 8.5 mg/l and BOD found from 2.8 to 11.0 mg/l. The main reasons for the river water pollutions are untreated municipal sewerage, untreated industrial liquid discharge and throwing of solid wastage in the river

Partnership Programmes to Conserve Environment

The Department of Environment (DoE) is carrying out mass awareness campaign and partnership programmes to ensure and conserve sound and livable environment. As part of these programs, DoE has established partnership with different children organisations, educational institutions and community organisations and assists these organisations in their environment conservation programmes in different ways. With the growth of population, rapid urbanisation, industrialisation and the economic activities are taking place. These activities have infused vibrancy in our economy, but at the same are taking heavy toll on environment. DoE has set up six Green Clubs in the schools of *Dhaka* and *Chittagong* metropolitan areas under the project entitled *Promotion of Environmental Awareness among School Children through Green Clubs* with a view to building an environment sensitive future generation. A supervisor has been appointed from among the science teachers of the schools to administer the day to day activities of the green clubs established as his additional duty under this project. Moreover, DoE has published a Green Club Manual for smooth running of the clubs. If a green club can be established at each school of the country, there would be a more environment sensitive generation who would take care of the environment themselves. The DoE has launched a program called 'Meet the People' meant to listen to the complaints of general people and the civil society and their advice and thereby to ensure environmental accountability. This programme works as a bridge between DoE and the public at large through which people can ventilate their grievances and also the way-outs.

Green Banking

Green banking initiatives of Bangladesh Bank (BB) broadly categorized into the following aspects: policy initiatives, monitoring of green banking activities of banks and FIs, refinance support from BB in diverse green products/sectors and BB's own initiatives in environmental management. 42 banks have exposure in green finance, either direct or indirect mode in FY2013-14. Total amount invested as green finance stood at Tk.38,221.32 crore in FY2013-14. Twelve out of thirty-one FIs have disbursed green finance in FY2013-14. Total amount of green finance in FY2013-14 stood at Tk.15,97.23 crore where direct green finance is Tk.9,14.76 crore and indirect green finance is Tk.6,82.47 crore.

A refinance scheme namely 'Financing Brick Kiln Efficiency Improvement Project' has been established in Bangladesh Bank under financing of Asian Development Bank (ADB) for reducing greenhouse gas emissions and refine particulate pollution from brick field of the country and building environment friendly brick field through development of efficiency of brick kiln with appropriate use of technology and energy. Under this scheme, conversion of Fixed Chimney Kiln (FCK) to Improved Zigzag Kiln and establishment of new Vertical Shaft Brick Kiln (VSBK), Hybrid Hoffman Kiln (HHK) and Tunnel Kiln etc. projects are included for refinancing. To enhance and pace up the refinance line, the terms and conditions for availing this refinance facility under this scheme has been amended in FY2013-14. 34 banks and 17 financial institutions have signed participation agreement with Bangladesh Bank till June 2014. A total of Tk.74.83 crore (equivalent US\$9.62 million) for 5 sub-projects has been disbursed under this Project till June 2014 and more 13-sub-projects are in the pipeline.

Conservation of Forest

At present the total forestland of Bangladesh is 1.60 million hectares of which 1.40 million hectares are natural forest and the rest 0.20 million hectares are created artificially by the Forest Department in the coastal region. Moreover, plantation has been carried out in 0.77 million hectares of homestead and fellow lands. The Forest Department has taken initiatives to implement different development projects and programs, to ensure suitable environment for agricultural production, enrich depleted forest resources, provide adequate supply of raw materials to wood-based industries, conserve and develop bio-diversity and expand eco-tourism.

Plantation programme is a major component among the activities of the Forest Department. Strip plantation (571 km), Bamboo plantation (640 ha), Cane plantation (592 ha), Murta plantation (50 ha), Jhao plantation (82 ha), plantation for controlling soil erosion and landslide (30 ha), Buffer zone plantation (2623 ha), Fodder plantation (13ha), Mangrove plantation (3968 ha), Non-Mangrove plantation (35ha), Goalpata plantation (127 km), Mound plantation (69 ha), Medicinal species plantation (40 ha), Rare and Ornamental species plantation (1.99 lakh) were established under this plantation programme.

Moreover, 1.56 lakh seedlings of forest, fruits and medicinal plant species were raised for sale and distribution to the people. Along with development projects, Forest Department also established 608 ha block plantation and 161 km strip plantation and raised 8.20 lakh seedlings for sale and distribution to the people.

In FY 2013-14, activities taken by Department of Forest related to Regulatory Reforms (RR) and good governance are as follows:

- According to the Forestry Master Plan and Millennium Development Goal (MDG), Forest Department has set a target to bring 20 percent of the total land under afforestation program by the year of 2015.
- Proposal is submitted for the amendment of Forest Act, 1927 to make it more compatible with the current situation.
- Proposal is submitted to enact Tree Conservation Act, 2014.

- The Wildlife (Preservation and Security) Act, 2012 has been enacted.
- A separate rule 'The Chittagong Hill Tracts Forest Transit Rule' is under process of promulgation after consultation with the Chittagong Hill Tracts Regional Council and District Councils

Social Forestry

Social Forestry is playing a vital role in reducing poverty and bringing about socio-economic development of rural areas. The Forest Department has implemented a total of four projects during the period from 1981 to 2006 with assistance from Asian Development Bank (ADB). During 2013-14 Forest Department established 9,955 hectares Block/Woodlot plantation, 860 km Strip plantation and raised 11.551 lakh seedlings under different projects. During the same period, Tk 2,922.00 lakh was distributed among 3,765 beneficiaries as their share under social forestry programme. Till date, about 5 lakh beneficiaries are involved with social forestry activities. Distribution of benefits is regulated by 'Social Forestry Rule-2004 (amended in 2010)'.

Bio-diversity Conservation

In an attempt to conserve the valuable living species, National Work Plan-2020 has been prepared. Various projects are being taken up under the work plan. A project titled *Implementation of National Bio-safety Framework* has been undertaken to implement 'National Bio-safety Framework'. Moreover, various programmes are being implemented at Cox's Bazar, St. Martin's island and Hakalukihaor to ensure conservation, management and sustainable use of bio-diversity in coastal and wetland areas. Projects/programmes taken by DoE are as follows:

- A project has been taken to integrate and update 'National Biodiversity Strategy and Action Plan' with the 'Strategic Action Plan 2011-2020';
- 'Community Based Adaptation in the Ecological Critical Areas through Biodiversity Conservation and Social Protection' project has been taken with assistance from Climate Trust Fund;
- Towards ensuring Biosafety and to address the potential risks of the genetically modified organisms on the human health and that on biodiversity and environment, a development project titled as Implementation of National Biosafety Framework is under implementation.
- To address the impact of climate change on the coastal and wetland biodiversity and ecosystems and to ensure sustainable management of biological resources, government is implementing a Climate Change Trust Fund project titled 'Community based Adaptation to Ecologically Critical Areas through Biodiversity Conservation and Social Protection'.
- 'Bangladesh Biological Diversity Act, 2014' has been approved by the cabinet in principle, is under the process of vetting in the legislative wing.
- Bangladesh Environment and Climate Change Outlook (ECCO) report that introduced Ecosystem-based Adaptation (EBA) has launched for public on August 2014.

Bangabandhu Sheikh Mujib Safari Park, Gazipur, near to Dhaka and *Sheikh Russel* Aviary Park, *Rangunia*, Chittagong have been established as a part of conservation of bio-diversity and natural environment of forests. Felling trees from natural forest including old trees of plantations has been stopped for conservation of bio-diversity. Harvesting of trees from natural forests of government *khasland* is being controlled. A Wildlife Crime Control Unit involving Police, Customs, Coast Guard and Forest Department has been established for controlling illegal killing and trafficking of wildlife through necessary co-ordination among the organisations. Tiger census has been started in *Sundarbans* with modern technology (camera trapping) and measures have been taken to relay the distraught tigers back into the *Sundarbans* from outside through tranquilization. Three new sanctuaries of *Padma* river in *Pabna* district named i) *Nagarbari-Mohanganj* dolphin sanctuary ii) *Shalinda Nagdemra* dolphin sanctuary iii) *Nazirganj* dolphin sanctuary have been declared as protected areas for conservation of rare species of dolphin.

Presently a number of special projects are being implemented by the Forest Department for wildlife and biodiversity conservation; such as i) *Bangabandhu Sheikh Mujib* Safari Park, *Gazipur* ii) *Sheikh Russel* Aviary Park, *Rangunia*, Chittagong iii) Strengthening Regional Co-operation for Wildlife Protection iv) Bio-diversity Conservation and Development of Ecotourism in Bangladesh and v) Development and Extension *Bangabandhu* Sarafi Park, Cox's Bazar.

To protect the remaining forests for future generation and to conserve its biodiversity local communities were involved to reinforce the management initiatives in 19 protected areas. As a part of this process co-management activity has been strengthened and social forestry programme has been expanded in different forest areas. 50 percent revenue from entry fee of protected areas is being allocated for landscape development and livelihood improvement of the local communities.

National Herbarium

Bangladesh National Herbarium (BNH) plays an important role in research and development of plant resources like medicinal resources, botanical and economically important plant of the country, and also takes other measures to preserve environment and conserve bio-diversity. 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. The Herbarium published a booklet series called "Flora of Bangladesh" which includes information about plant species of the country.

The Herbarium carried out a range of activities during FY 2013-14 which include among others Botanical Survey Activities, Plant Identification, Plant Specimen Preservation, and Developing Database of the Identified Samples, Plant Preservation, Publication of Flora of Bangladesh, Floristic Publication and Recording of Plant Species as new records get available in Bangladesh. In addition, a program titled *Red Data Book of Vascular Plants of Bangladesh, Vol-2*, during the period from FY 2009-10 to FY 2012-13. BNH is working on "Red Data Book of Vascular Plants of Bangladesh, Vol-3" during FY 2013-14 with the target of publishing "Red Data Book of Vascular Plants of Bangladesh, Vol-3" by June 2015.

Forest Research

Bangladesh Forest Research Institute (BRRI) conducts research on forest resources and forest development. The core objective of this institution is to ensure proper utilisation of forest resources and innovation of sustainable technology for environmental development. The BRRI conducts few training programs on some technologies to create self employment. Some of those are as follows:

- 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 (such as wood, bamboo, cane, sun-grass, straw, bamboo materials for betel leaf farm etc);
- 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 coppice management and its rotation to increase the productivity of fuel wood species;
- Nursery and plantation technique of important mangrove species;
- Technique for manufacturing particle board using wood and bamboo wastes;
- Easy and cost effective planting technique of tree seedlings.

Natural Disaster Management

Bangladesh is one of the most disaster-prone countries in the world. Every year, lives and property are affected due to various disasters. Among these disasters, the cyclone of 1970, 1991, cyclone SIDR in 2007, cyclone *ailan* in 2009 and flood of 1988, 1998, 2004 and 2007 were most devastating. Ministry of Disaster Management and Relief have been playing a vital role in disaster risk reduction and preparedness and post disaster rehabilitation management. The vision of the government is to reduce the risks of disasters especially for the poor and vulnerable people and to establish an efficient emergency response system capable to handle large scale disasters by strengthening the overall disaster management capacity.

Actions/Initiatives Taken in Disaster Management

(A) Preparatory Activities

- Shifting from the culture of the traditional relief and rehabilitation and adoption of more modern risk reduction and preparedness techniques to ensure sustainable development.
- ICT based microzonation mapping helps in planning of urbanisation to reduce risk of earthquake. Microzonation map has been developed for 3 major cities e.g. *Dhaka, Chittagong and Sylhet*, considering the earthquake vulnerability and risk of these

cities. Preparation of microzonation maps of six more cities e.g. *Mymensingh, Tangail, Bagura, Dinajpur, Rajshahi and Rangpur* will be completed by 2014. Survey and development of a database of buildings in Dhaka and Chittagong is also going on.

- To strengthen the wireless network, 116 VHF and 40 HF of CPP has been replaced under ‘Cyclone Preparedness Programme (CPP)’ implemented by Red Cross of Bangladesh with financial and technical assistance of Red Cross USA/IFRC to reduce the loss of lives and properties and to disaster forecast warning.

(B) Activities Related to Act, Policies, Rules and Contracts

- Disaster Management Act has been effective for Disaster Management in the country.
- To specify the activities of different ministries, organisations and local govt. institutions SOD (Standing Orders on Disaster) has been amended.
- For proper maintenance of the cyclone shelters built by different organisations “Cyclone shelter building, maintenance and management policy” has been approved.
- Draft of National Disaster Management Policy is going to be finalised.
- Formulation of the Rules under Disaster Management Act is under active consideration.
- A treaty has been signed between SAARC Disaster Management Centre (SDMC) and Bangladesh to establish Bangladesh Disaster Knowledge Network (BDKIN) for mutual exchange of Disaster information on Disaster risk reduction, mitigation, response/preparedness and recovery.
- Bangladesh has become the member of Asian Disaster Management Centre (ADMC) Regional Integrated Multi Hazard Early Warning System (RIMES), Asian Ministerial Conference on DR (AMCDRR) and International Search and Rescue Advisory Group (INSARAG).

(C) Actions Related to Preparation of Plans

- ‘National Disaster Management Plan (2010-2015)’ has been approved as the part of commitment expressed in ‘The Hugo Framework for Action (HFA)’ adopted in the world conference for disaster reduction held in Kobe, Japan in 2005.
- Ministry of Relief and Disaster and Management is preparing ‘SAARC Plan of Action for Disaster Management’ through integration of disaster management plan and policies.
- Bangladesh is vulnerable to earthquake because of the location of the *Dowke* fault in *Sylhet* border, *Modhupur* fault in *Tangail*, the connection of Indian plate and Eurasian plate in the North-East border. Analysing available facts and figures, microzonation map for 3 major cities e.g. *Dhaka, Chittagong and Sylhet* have been developed. Besides, Preparation of microzonation maps of *Mymensingh, Tangail, Bagura, Dinajpur, Rajshahi and Rangpur* is underway.
- National Contingency Plans have been prepared for early recovery from any disastrous event including earthquake. National contingency plans are prepared for different organisations responsible for emergency response such as Department of Disaster Management, Bangladesh Fire Service and Civil Defense, Armed Forces Division, Cyclone Preparedness Programme, City Corporation of *Dhaka, Chittagong and Sylhet* and for various service providers like electricity, gas, T&T, WASA, and health.

- The inundation maps/risk maps for flood (for flood prone areas) and storm surge (coastal area) have been developed (up to *toupa* level) and uploaded in the DMIC website (www.dmic.org.bd/inmap). The map could be used to determine the safe plinth level for construction of houses, shelter, *kill*, road, embankment and any other infrastructure.
- Assistant to Directorate of Women Development to prepare a work plan for disaster risk reduction.
- For the city areas comprehensive health service action plan has been prepared to face disaster.
- Climate proofing guideline for fisheries and livestock sector and training manual on 'Coastal Zone Vulnerability to Climate Change Adaptation' have been prepared with the assistance of Department of Environment

(D) Awareness Building and Lesson Learning Programmes

- To create awareness among the students a chapter on disaster management and climate change has been incorporated in the curriculum of class III-XII.
- Four Research programme on climate change adaptation have been completed and in partnership basis climate change adaption program is running with some related organisations.
- Disaster management related 'Union Information Service Center' guideline (10,000 copies) has been distributed to 4,500 union information centers.
- Capacity Building programme has been running with 17 universities and 11 training institution to create expert manpower on Disaster Management and Climate Change.
- To make Disaster Management and Climate Change curricula more easier 10 E-learning centre have been established in different institutions.
- Solution exchange programme have been established to make easy E-communication for the participants on Disaster Management and Climate Change programme.

(E) Training Initiatives

- Advanced GIS training module is developed to establish a disaster risk reduction database with information, data, lifeline and emergency information and for emergency response.
- Trainings have been imparted on GIS to 60 officers of *Titas* Gas, Armed Force Division, Fire Service and Civil Defense etc. who are the focal point for emergency response.
- The government alone cannot handle large scale disasters. Therefore, a total of 62,000 volunteers are being trained under the supervision of Fire Service Department with assistance from the Disaster Management Bureau. A total of 48,000 volunteers have been trained on rescue activities and primary health care.
- The Ministry of Education and Ministry of Primary and Mass Education are being supported to make schools safer through non-structural interventions. In coordination with these ministries orientation for the Instructors and Education Officers of the *Upazila* Primary Education Resource Centers of 493 *upazila* on earthquake safety have been organized and drills, orientation to the Headmaster and Physical Education teacher of 268 higher secondary schools of Dhaka on earthquake safety have also been organized.

- To develop the awareness and capacity of the District, *Upazilla* and Union Disaster Management Committee 240 officials of 6 districts have been trained on Harmonized Training Module program. And a plan has been taken to train another 420 officials of 7 districts.
- Under ECRRP-D1 project 840 officials of 19 districts will be provided training on Disaster Management. 320 officers from 4 districts has already been trained and others will get the training soon.
- A target of training to improve Disaster Management Capacity for 240 officers of 6 district and *upazilla* DMC members has been taken with the finance of GoB.
- Besides a target of training on Disaster Management for all DRRO's of 64 districts and an English Course for 20 officers of DDM and Law, rules and computer training for newly appointed 16 Office Assistant has been taken.

(F)Actions Related to Disaster Reduction, Procuring Equipment and Structural Intervention

- For dissemination of information relating to Disaster Management information to the *upazilla* level network have been extended to 75 more *upazilla* in addition to 410 disaster information centre.
- To strengthen recovery facilities for earthquake and other disaster equipment of 69 crore taka have been hand over to Fire Service and Civil Defence, Armed Forces Division and City Corporation. A portion of newly 20 Crore taka worth equipments for investigation and recovery activities have been given to FSCD. The rest of the equipment have been given to BMD, Directorate of Geological Survey and to Bangladesh University of Engineering and technology for research and data collection.
- For emergency response 12 emergency motor vehicle and 6 water ambulance have been purchases for the cyclone prone coastal belt and 25 more small sizerough sea aquatic boat is under procurement process.
- 74 flood shelters have been built and project of building 156 more flood shelters have been approved for the flood prone are.
- The study named 'Multipurpose cyclone shelter programme' of Planning Commission suggested to build 5,000 cyclone shelters. Presently, 3,751 multipurpose cyclone shelters have been constructed with the GOB fund. Besides these with the Govt. fund climate change Trust fund and Donor depended climate change resilient fund construct of several hundreds cyclone shelters are on process. According to Govt. instruction local govt. division is building *Union ParishadBhaban* in the distingue of cyclone shelters.
- After the affect of cyclone *aila* Government had built and 6,186 houses under climate change Trust fund. Among them around 4,000 houses are climate resilient. In 2013 Tornados affected *Brahmanbaria* district 100 disaster resilient houses are constructed under climate change trust fund.
- To ensure pure drinking water for the *aila* affected disaster area CDMP has constructed 203 rain water reserver and 60 is under construction. CDMP has also established 68 pond and felter.

Early Warning Signals and Emergency Response Activities

In traditional system early warning signals is reached through the print media, electronic media and fax to district administration. Following three systems are newly included to send disaster message:

- **Cell Broadcasting System (CBS):** CBS plays a vital and effective role in dissemination of warning message as mobile technology and network established in every corner of the country. Disaster related information, early warning signals and liaison messages will be seen in mobile screen in a specific geographical area. To achieve this target, DDM signed a MoU with Grameen Phone (GP) and Teletalk to send message (20 characters) to the mobile users of *Cox's Bazar* (Cyclone prone) and *Sirajgong* (Flood prone) as pilot initiative. After the success of the pilot initiatives, another MoU is expected to be signed between DDM and GP to extend the coverage to 14 coastal districts with increasing the length of the message to 80 characters.
- **Interactive Voice Response (IVR):** It is a much appreciated initiative of CDMP and received national and international award. The IVR system is now installed and connected with six mobile service providers. Technical training on the IVR has been provided to FFWC and BMD officials. Anyone can have hazard/disaster related update by dialing 10941 from the IVR system.
- **Mobile Short Message Service (SMS):** SMS helps in maintaining coordination among all the officers responsible for discharging all kinds of duties related to disaster, disseminating internal early warning signals and creating public awareness. Considering the immense potential of mobile phone use, a database is under preparation including the contact number of chairman and secretaries of union, *upazila* and district level disaster management committees by DDM. This facility provides the general public 24/7 access to fetch updated pre-recorded multi-hazard early warning messages collected from Flood Forecasting and Warning Centre (FFWC) and Bangladesh Meteorological Department (BMD). The system offers bilingual format of Bangla and English and is now covering all existing mobile telephone networks.
- **Disaster Management Information Center (DMIC):** To establish an internet based information communication technology and infrastructure DMIC is build up to the office of DDM at 64 district and 485 *upazils*. Initiatives have been taken to send disaster alert through SMS to Union Information Service Center from the DMIC.

Water Resources

The Ministry of water resource formulates policies, rules and regulations, plans, and strategies, relating to water resources development and management and regulates the functions of all organizations under its control. Bangladesh Water Development Board under this Ministry implements projects for flood protection, drainage and irrigation, river bank erosion, delta development and land reclamation, river dredging etc. and constructs barrages, regulators, sluices, irrigation canals, cross-dams, rubber dams, flood protection embankments, coastal embankments, excavates and re-excavates *canals* under different projects. The importance and contribution of water resources is unlimited in agricultural development as well as the socio-economic development of the people of Bangladesh.

In FY 2013-14, a total of 43 major hydraulic structures, 104 minor hydraulic structures, 199 km. embankment, 104 km. of drainage channels, resectioning of embankment 869 km., re-excavation of drainage channel 458.38 km., river training 195.14km. and 137 km. of irrigation *canals* were constructed. Main projects under Ministry of Water Resources are:

- ***Buriganga River Restoration Project:*** To improve the water quality of rivers around the Dhaka city a project titled '*Buriganga River Restoration Project (New Dhaleswari-Pugli- Bangshi-Turag-Buriganga River system)*' is being implemented at a cost of 94,409.07 lakh. The physical and financial progress of this project by June 30, 2014 is 11.32 percent and Tk. 9,338.37 lakh respectively.
- ***Gorai River Restoration Project (Phase-2):*** The total cost of this project is Tk. 94,214.55 lakh. Meanwhile maintenance work including capital dredging for 30 km. has been completed. Two high capacity dredgers have been procured using the resources of this project. The physical and financial progress up to June 2014 is 61.44 percent and Tk. 50,463.56 lakh respectively.
- ***Ganga Barrage Project:*** The Government of Bangladesh approved a study project named '*Feasibility Study and Detailed Engineering for Ganges Barrage Project*' at a cost of Tk. 4,563.69 lakh. As per ToR, the study began in May 2009 and the physical and financial progress of the project up to June 2014 is 99 percent and Tk. 4,200.33 lakh respectively. The study is now completed and design is in progress.
- ***Capital (Pilot) Dredging of River System in Bangladesh:*** The capital dredging for 22 km. in the river *Jamuna* has so far been completed and maintenance dredging is in progress under this project. The physical and financial progress of the project up to June 2014 is 99 percent and Tk. 71,633.18 lakh respectively.
- ***River Dredging for Restoration of Navigability and Retention Capacity of Major Rivers:*** Dredging is the most effective programme to address the issues like river erosion, riverbed rising and water logging. BWDB has taken up programs for capital dredging and management of major rivers (*Ganges-Padma, Brahmaputra-Jamuna and Meghna*) and with a view to restoring navigability and retention capacity of the major rivers, dredging/excavation activities are in progress under 7 approved projects of BWDB for a total length of 330 km. Programme have also been taken up to procure 11. dredgers including ancillary water vessels under the project titled '*Procurement of Dredgers and Ancillary Equipments for River Dredging in Bangladesh*' at the cost of Tk. 1,309.88 crore.
- ***Water Management Improvement Project (WMIP):*** The total cost of this project is Tk. 982.28 crore aims at improving national water resource management by involving the local communities to play an expanded role in all stages. The physical and financial progress as on 30 June 2014 are 66.62 percent and Tk. 62,225.56 lakh respectively.
- ***Rehabilitation projects:*** Due to negative impact of climate change, 19 districts of the southern region of the country has become prone to different natural calamities including cyclones and surges, recurrent floods, drainage and water logging, drought, salinity intrusion and river erosions. Two projects have been taken up under World Bank financed of ECRRP at a cost of Tk. 339.23 crore and Government financed of *Rehabilitation of BWDB Structures Damaged by Cyclone AILA in the Coastal Area* at a cost Tk. 377.55

crore as extensive programmes for the rehabilitation of *SIDR* and *AILA* damaged structures respectively. The projects are expected to be completed by next two years.