

CHAPTER FIFTEEN

ENVIRONMENT, CLIMATE CHANGE AND DEVELOPMENT

Global detrimental consequences of climate change have created inviolable challenges especially for the least developed and developing countries like Bangladesh. It is unanimously recognized that Bangladesh remains a forerunner in its adaptation unswerving endeavours resulting combating environmental degradation. Nevertheless, the continued substantial efforts are in the process of integrating elements pertaining to environment with mainstream development policies in order to ensure economic growth and environmental sustainability. A good portion of policies and development plans have been adopted and are being implemented to address environmental hazards and to ensure a pollution-free eco-friendly environment. Furthermore, a detailed work plan has been promulgated with a view to achieving environmental targets of Sustainable Development Goals (SDG's). 'Bangladesh Climate Change Strategy and Action Plan, 2009 (BCCSAP 2009)' is being implemented to address the impact of climate change where both adaptation and mitigation activities have been considered. In this plan, 44 programmes under six thematic areas were identified. For this reason, Bangladesh Climate Change Trust Fund (BCCTF) was created in 2010 from the Government's own revenue sources to combat climate change impacts as well as to implement Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009. All projects taken up under BCCTF are based on the thematic areas mentioned in BCCSAP 2009. During FY23 up to February, 2023), under this scheme total of Tk. 94.88 crore has been disbursed as refinance facility from the fund against Bank and FI's financing, in total 10 green products/initiatives such as Biogas plant, Green Building, Green Industry, Vermi Compost, Solar Home System, Biological ETP, Net Metering Rooftop Solar System, Installation of Energy Auditor Certified machineries, Environment Friendly/Brick Kiln Efficiency improvement Project, and Safety and Work Environment of Factory. National Environmental Policy, 2018, Bangladesh Biodiversity Act 2018, Environmental Crisis Management Rules, 2017, Air Pollution (Control) Rules, 2022 have been promulgated to take into account the challenges of environment, biodiversity conservation and management. Ministry of Environment, Forest and Climate Change has also undertaken different consciousness programmes and restructuring activities for environment conservation along with Ozone Layer Protection and pollution control. Ministry of Disaster Management and Relief and Ministry of Water Resources are also implementing various programmes/ projects in order to tackle eventualities emanating from natural disasters.

The concept of environmental protection as well as its development received wider global attention from the early 1970s. 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. The 'United Nations Environment Programme (UNEP)' was formed by this conference. In 1992, an Earth Summit was held at Rio De Janeiro in Brazil, which is considered as a landmark in the

environment conservation. Later, 'Kyoto Protocol' was signed in 1997, which proposed lessening of carbon dioxide and greenhouse gas emission.

Table 15.1 shows the list of 10 highest emitting countries with the level of their Green House Gas (GHG) emissions, which accounts for almost 63.22 percent of global GHG emission. In 2019, the global GHG emission stands at 51,880.75 MtCO₂.

Table 15.1: Top Ten Greenhouse Gas Emitting Countries in the World

Sl. No	Country	Annual CO ₂ Emissions in 2019 (In millions of metric tonnes)	percent of Global Total in 2019
1	China	12705.1	24.49
2	USA	6001.2	11.56
3	India	3394.9	6.54
4	Europe	3383.4	6.52
5	Russia	2476.8	4.77
6	Japan	1166.5	2.24
7	Brazil	1057.3	2.03
8	Indonesia	1002.4	1.93
9	Iran	893.7	1.72
10	Canada	736.9	1.42

Source: CAIT Climate Data Explorer, March, 2023.

Activities on Climate Change

Global Climate change is one of the most crucial challenges of current time that threaten the existence of human civilization. The IPCC's latest scientific assessment report titled Sixth Assessment Report (AR6) has issued a red alert on the existence of human civilization for global climate change. Due to global warming, cyclones, tidal surges, flash floods, heavy rains, droughts, droughts and other natural disasters are occurring at an increasing rate. Over the next two decades, temperature will exceed 1.5 degrees Celsius, ahead of the Industrial Revolution, which could rise to more than 3.0 degrees Celsius by 2100 unless immediate and comprehensive action is not taken to tackle global climate change. The Department of Environment, under the Ministry of Environment, Forests and Climate Change (MoEFCC) is providing necessary assistance and overall coordination to various ministries/departments/agencies to ensure climate resilience in Bangladesh through the implementation of adaptation and mitigation measures in response to climate change. Bangladesh has achieved enviable success in

addressing the climate change which is being appreciated in the international arena. The major initiatives to address climate change are as follows:

BCCSAP Update

The Government of Bangladesh formulated a comprehensive strategy and action plan, titled Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2009, which is currently being updated. An updated BCCSAP has already been drafted which will be finalised soon.

Formulation of National Adaptation Plan (NAP)

The government has formulated the National Adaptation Plan of Bangladesh (NAP) 2023-2050 and submitted to the UNFCCC Secretariat on 31 October 2022. In the future, NAP will serve as a key document in implementing adaptive activities in the country under the UNFCCC process. The NAP has culminated the vision of "Building a climate resilient nation through effective adaptation strategies for fostering a robust society, ecosystem and stimulating sustainable economic growth." The following six goals have been set aiming in the NAP to attain the above vision –

- Ensuring protection against climate change and disasters;
- Developing climate-resilient agriculture;
- Building climate-smart cities;
- Protecting nature for adaptation;
- Integrating adaptation into planning; and
- Ensuring capacity-building and innovation in adaptation.

In order to achieve these goals, the NAP has determined 23 adaptation strategies and identified 113 interventions primarily (including 90 high-priority and 23 moderate-priority) that encompasses 8 sectors and considers 11 climatic stress areas across the country.

Submission of Nationally Determined Contributions (NDC)

Bangladesh has prepared and submitted its Nationally Determined Contribution (NDC) in 2015 to the UNFCCC. As per the commitment to the Paris Agreement, Bangladesh revised and submitted Updated Nationally Determined Contribution (NDC) on 26 August 2021, enhancing both unconditional and conditional contribution with ambitious quantifiable mitigation targets. In its NDC, Bangladesh has committed to reduce its GHG emissions by 27.56 million MtCO₂e or 6.73 percent below BAU in 2030 as an unconditional contribution (using own resources) while reducing an additional emission by 61.9 million MtCO₂e or 15.12 percent below BAU in 2030 as a conditional contribution (with international support). Various activities are being undertaken by the concerned ministries, departments, and agencies to achieve the targets of the NDC which are being coordinated by the Ministry of Environment, Forests and Climate Change.

Implementation of Mujib Climate Prosperity Plan (MCPP)

With the advent of the birth centenary of the Father of the Nation, Bangabandhu Sheikh Mujibur Rahman, the Government of Bangladesh has taken the 'Mujib Climate Prosperity Plan' - a strategic investment framework to mobilize financing, especially through international cooperation for the protection of future generation from climate change. The Mujib Climate Prosperity Plan shifts Bangladesh's trajectory from one of vulnerability to resilience to prosperity (VRP). The MCPP is currently waiting for approval.

Bangladesh's Representation on Climate Change in the International Arena

Bangladesh has achieved remarkable success in climate change risk and disaster management which is being applauded in the international

arena. Bangladesh is actively participating in various constitute bodies of the UN Framework Convention on Climate Change (UNFCCC).

The 27th Session of the UN Climate Change Conference, COP 27, was held from 6 to 20 November 2022 in Sharm el-Sheikh, Egypt. Participation of Bangladesh Delegation at the COP27 was vivid and active. At the COP 27 ministerial level negotiations, on behalf of the LDC, Bangladesh led the negotiation on Funding Arrangements for Loss and Damage, Mitigation Work Programme, Global Goal on Adaptation and COP27 Cover Decision. A total of 197 parties including 195 UNFCCC member countries participated in this conference. Various important decisions and significant aspects taken at COP-27 to deal with climate change are as follows:

- Parties, for the 1st time, agreed to adopt a breakthrough agreement on funding arrangements for addressing loss and damage in the most vulnerable developing countries due to the adverse effects of climate change. (Parties also agreed to establish a 'transitional committee' to make recommendations on how to operationalise the fund, institutional arrangements and funding sources at COP28.);
- Parties agreed on the way to move forward on the Global Goal on Adaptation, which will conclude at COP28;
- Standing Committee on Finance has been requested to prepare a report on doubling adaptation finance for consideration at COP28 next year;
- The mitigation work programme has been launched aimed at urgently scaling up mitigation ambition and implementation. Governments were also requested to revisit and strengthen the 2030 targets in their national climate plans by the end of 2023; and

- Accelerated implementation of commitments to increase climate finance to USD 100 billion annually by developed countries in 2020-24.

Green Banking and Sustainable Finance

To facilitate green products/sector financing such as solar energy, bio-gas plant, effluent treatment plant, Bangladesh Bank established a revolving refinancing scheme of Tk. 200 crore in 2009 for green products/sector from its own fund. The size of the fund has been increased to Tk. 400 crore in view of the growing demand for financing of environment friendly products/initiatives in 2020. At present, this scheme is known as ‘Refinance Scheme for Environment Friendly Products/Initiatives’. During FY23 up to February, 2023), under this scheme total of Tk. 94.88 crore has been disbursed as refinance facility from the fund against Bank and FI’s financing, in total 10 green products/initiatives such as Bio-gas plant, Green Building, Green Industry, Vermi Compost, Solar Home System, Biological ETP, Net Metering Rooftop Solar System, Installation of Energy Auditor Certified machineries, Environment Friendly/Brick Kiln Efficiency improvement Project, and Safety and Work Environment of Factory.

Steps have been undertaken during FY 2022-23:

- For the modernization and technological development/up-gradation of export oriented industries, a refinancing fund of Tk.1,000.00 crore has been formed in the light of ‘Export Policy 2018-21’ by Bangladesh Bank which is named as ‘Technology Development/Up-gradation Fund’. Under this fund, Tk. 63.24 Crore has been disbursed under the fund till February 2023.
- ‘Green Transformation Fund (GTF)’ was introduced for widening the scope to manufacturer-exporters irrespective of sectors against import of capital machinery and accessories for implementing specified

green/environment-friendly initiatives. USD 140.94 million and Euro 71.21 million have been disbursed from GTF as of February, 2023.

- Bangladesh bank monitors the CSR activities of operational bank and FIs in Bangladesh. As a part of this monitoring, in the period of January-December 2022 the total CSR expenditure of banks is Tk. 1,146.32 crore whereas the total CSR expenditure of FIs is tk. 8.39 crore as per provisional data.
- Bangladesh Bank instruct all scheduled banks and to donate 5 percent from their CSR budget in Prime Minister’s Education Assistance Trust Fund each year.

Besides, To mitigate the crisis due to COVID-19 pandemic by facilitating export oriented industries for boosting up export activities, Bangladesh Bank introduced a refinancing scheme named ‘Pre-shipment credit Refinancing Scheme’ of Tk. 5,000.00 crore. Already, 40 banks signed agreement with Bangladesh Bank for availing such facilities under the scheme. As of February 2023, 272 export oriented industries received the refinance facility for an amount of Tk. 3,007.28 crore.

Removing Air Pollution

Air pollution is increasing with rapid urbanisation and industrialisation. Emissions from brick kiln, construction activities, industrial operation and vehicle are considered the key sources of air pollution. The Department of Environment (DoE) works for establishing energy saving, effective in air pollution and modern technology based environment-freindly brick kiln instead of traditional brick kiln to reduce brick kiln emission. Introduction of eco-friendly blocks instead of burnt bricks: Ministry of Environment, Forests and Climate Change “Brick Preparation and Kiln Installation (Regulation) Act, 2013 (Amended 2019)” to reduce the use of burnt bricks in government construction, repair except

roads and highways and issued a government notification setting a target of 100 percent block utilization by 2025 in renovation works (buildings, herring bone bond roads, rural roads type-B). Coordination is being done with various concerned departments/organizations/institutions of the government to ensure 100 percent use of blocks by 2025 as an alternative to bricks. Already various departments/organizations/institutions of the government are including the issue of block use in project documents. Cases against illegal environment polluting brick kilns have been filed against 2,360 individuals/organizations by conducting various mobile courts from January, 2019 to December, 2022 and Tk. 86.74 crore penalty imposed. Also 290 persons were sentenced to various terms of imprisonment and 761 illegal brick kilns were demolished. All illegal brick kilns will be phased out.

The Air Pollution (Control) Rules, 2022 were gazetted on July 26, 2022 to effectively control and reduce overall air pollution. Necessary steps have been taken for overall implementation of Air Pollution (Control) Rules, 2022. The Department of Environment is conducting round-the-clock air monitoring activities in other departmental and industrial cities of the country including Dhaka. In order to measure the level of air pollution, air quality monitoring activities are being conducted regularly in various important places of the country through a total of 31 CAMS (Continuous Air Monitoring System) and C-CAMS in the departmental and industrial cities of the country including Dhaka. From January 2019 to January 2023, 90 cases have been registered and a fine of Tk.16.36 lakh has been imposed against vehicles emitting black smoke by conducting a number of mobile court drives. The government is implementing hydrochlorofluorocarbon (HCFC) phase-out activities as per Montreal Protocol. According to schedule of Montreal Protocol HCFC Phase-Out Management Plan (Stage-II) is being

implemented with the target of 67.5 percent reduction by 2025.

Industrial Pollution Control

Issuance of Environmental Clearance: In accordance with Section 12 (1) of the Environmental Protection Act, 1995 (Amended 2010) in Bangladesh, it is mandatory to obtain environmental clearance in the prescribed manner as per the Environmental Protection Rules, 1997. According to the rules, all types of industries and projects are being forced to take environmental clearances. In the last 14 years from 2009 to 2023, about 74,000 environmental clearances are given in the case of establishing industry or implementing projects and about 1,28,000 environmental clearances have been renewed.

Establishment of ETP: To prevent water pollution, the Department of Environment has continued monitoring activities to set up Effluent Treatment Plant (ETP) for the industrial enterprises discharging liquefied waste. As a result, ETPs have already been set up in most of the water polluting industries. ETP has been set up in 2,382 out of 2,894 industrial establishments to be set up by January 2023.

IP Camera set up: Plans have been taken to set up an online monitoring system for monitoring the activities of the ETP. In order to monitor whether the ETP installed in the industrial establishments running in different districts of the country is being properly managed, the entrepreneur of the concerned industrial establishment has given instructions to install IP cameras in the ETP area of the said establishment. IP cameras have already been installed in 239 industrial establishments.

Implementation of Zero Discharge Plan: Zero Discharge Plan is being implemented by the DoE in the industrial establishments discharging liquid waste under which the industrial enterprises are reusing the generated liquid waste without discharging it in nature. From 2014 to January, 2023, the DoE has approved a Zero Discharge

Plan in favour of a total of 624 T-Waste Emitting Industries.

Pollution Control Enforcement Activities

In order to prevent the destruction of the environment and the widespread pollution of the environment, the DoE started enforcement activities under the said section of the Act against polluters from July 13, 2010. Under the enforcement activities, the DoE takes other legal action including imposition of compensation against persons/institutions involved in pollution and conducts regular monitoring activities of industries. According to Section 7 of the Bangladesh Environmental Protection Act, 1995, there is a provision to collect compensation by conducting enforcement activities against polluting industrial establishments. DoE has carried out operations from July 2010 to January 2023 against 11,883 river polluting industrial establishments for damaging the environment and imposed fines of Tk 484.75 crore.

In addition to raising public awareness, enforcement and mobile court activities has been carried out to control noise pollution. According to Noise Pollution Control Rules 2006, industrial units / project activities/vehicles which produce noise more than the limit mentioned in the standard, DoE has taken legal action against them. From January 2019 to January 2023 DoE conducted 458 mobile courts against 2,357 persons/projects/vehicles and imposed fines of Tk 25,01,500.

A project titled “Integrated and Partnership Project on Noise Pollution Control” has been taken up by the Department of Environment. As part of the implementation of the noise Pollution (Control) Rules 2006 under the said project, the roads around the Bangladesh Secretariat and Agargaon administrative area have been declared "silent areas" from 17 December 2019. Under the programme, noise level survey was conducted in 8 divisional cities and a total of 19,944 people including government officials, drivers and

school students were trained. 230 sound level meters have been distributed to various offices of Bangladesh Road Transport Authority, Bangladesh Police and Department of Environment under the program to strengthen noise pollution monitoring activities.

Govt. has taken different steps for curbing the use of illegal shopping bag which is seriously harmful for environment. Dept. of Environment has been conducting mobile court regularly against illegal polythene shopping bag manufacturing factories to impose fine and confiscated illegal polythene shopping bag. Meanwhile, Mymensingh divisional commissioner has declared Mymensingh division as illegal Polythene free division. Awareness Campaign has been conducting in important markets in Dhaka and other City areas. From January, 2019 to January, 2023, DoE has conducted 2,173 mobile court against 3,554 persons/project/industry. 'Multisectoral Action Plan for Sustainable Plastic Management in Bangladesh' has been formulated to ensure proper and environmentally friendly management of plastic waste. The Action Plan has set a target of 50 percent plastic waste by 2025 and 80 percent plastic waste recycling by 2030. Also, a 3-year action plan has been adopted by the Department of Environment to stop the use of Single Use Plastic. Under the action plan, activities are being conducted to stop the use of Single Use Plastic in 40 *upazilass* of 12 coastal districts and 08 areas of *Chattogram* city.

Formulation of Biodiversity and Biodiversity Regulations

- **National Environmental Policy, 2018:** Taking into account the challenges of environment, environment and biodiversity conservation and management, the government has finalised the National Environment Policy 2018 on 3 October 2017 and published it in 2019 with the aim of developing the overall environmental

conservation management of the country. In the newly adopted National Environmental Policy 2018, out of 9 more sectors/areas including the previous 15 sectors, mountain environment, biodiversity and environment conservation and life security, eco-friendly tourism, etc. sectors have been included with special emphasis. In order to implement the activities included in the 24 sectors mentioned in the National Environmental Policy 2018, the concerned ministries/divisions/agencies have been identified which will be implemented by their respective ministries/divisions/agencies.

- **Bangladesh Biodiversity Act 2017:** The Bangladesh Biodiversity Act 2017 has been promulgated with the aim of conserving biodiversity and ensuring its sustainable use and has come into force on 30 November 2017. Under the Act, a Union Biodiversity Management Committee has been formed from the National Committee on Biodiversity to implement biodiversity conservation activities at the grassroots level.
- **Environmental Crisis Management Rules, 2016:** Vested with the power under Bangladesh Environment Conservation Act, 1995 (amended 2010), to preserve and promote the environment and to control and abate pollution, the Government has issued Ecologically Critical Area Management Rule-2016. ECA management national committee has been formed according to the above-mentioned rules.

National Biodiversity Strategy and Action Plan (2016-21):

Bangladesh has adopted 'National Biodiversity Strategy and Action Plan (NBSAP) 2016-21' based on 'UN Biodiversity Strategic Plan 2016-21'. The main theme of NBSAP is to preserve national biodiversity. The main activities of NBSAP's are:

Ecologically Critical Area (ECA)

To protect the important environment and biodiversity of the country and to preserve and improve the natural environment, the government under the Bangladesh Environmental Protection Act 1995 to cut or extract natural forests and plants for the conservation of biodiversity, killing all kinds of prey and wildlife, oysters, corals, turtles and other wildlife. The government has already declared 13 important areas as Ecologically Critical Areas (ECA) by banning all activities such as collection, destruction of animal and plant habitats, etc.

To conserve biodiversity as well as to increase mass awareness, a meeting was held with the presence of the local community on 11th September 2022 in the ECA areas of the Jaflong-Dauki River ECA areas. In addition to, conserving the environment, ecosystem, and biodiversity as well as ensuring sustainable tourism in *Saint Martin* Island as an ECA area, a consultation was held on 29th October 2022 in *Cox's Bazar*.

Blue-Economy Implementation Activities

The DoE has adopted a blue-economy action plan to conserve marine environment, prevent marine pollution, ensure marine resource extraction and environmental management, and conserve marine and coastal biodiversity and mainstream development activities. 'Assessment of Coastal and Marine Biodiversity Resources and Ecosystems to Implement the Blue Economy Action Plan' project has been adopted to implement the activities included in the action plan. An integrated repository of coastal and marine resources and environment and biological resources has been created under this survey project.

Groundwater quality monitoring

The Department of Environment is regularly monitoring surface as well as groundwater. The Department of Environment monitors water

quality at 99 points of 30 rivers. The parameters are pH, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Suspended Solid (SS), Total Dissolved Solid (TDS), Electrical Conductivity (EC), Chloride, Turbidity, total Alkalinity. Department of Environment is monitoring ocean water quality at four points to monitor the environment, ecosystem, and biodiversity of the coast and coastal areas.

Sustainable Development Goals (SDGs) and Bangladesh

The government is working for the implementation of the environment and climate related goals and targets of SDGs. Among 17 goals of SDGs, 3 goals are directly linked with environment and climate. The Goal 13 declares 'Take urgent action to combat climate change and its impacts'. According to the first indicator of goal 13 'Number of deaths, missing persons and directly affected persons attributed to disasters per one lakh populations reduce to 6,500 by 2020 and 1,500 by 2030.'

The goal 14 says 'Conserve and sustainably use the oceans, seas and marine resources for sustainable Development'. One of the key targets of this goal is 'Coverage of 2.5 percent of marine areas of Bangladesh as protected area'.

The goal 15 states that 'Protect, restore and promote sustainable use of terrestrial ecosystem, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss'.

Conservation of Forest and Biodiversity

Bangladesh Forest Department (BFD) implement activities to increase forest and tree cover, restore forests, reduce deforestation and forest degradation, conserve wildlife and biodiversity, establish green belt in coastal areas and reduce the dependency of forest-dependent communities on forests through providing Alternative Income Generation (AIG) activities by involving the

community in co-management of protected areas and collaborative forest management in the reserved forest areas. According to available information in FY 2019-20 total forest land is 25,75,196 hectares which is 17.45 percent of total area of the country. BFD is responsible for conservation and management of 18,80,494 hectares forests. Forest Department is implementing activities under 16 projects to restore forest and ecosystem, increase forest and tree cover, conserve wildlife and biodiversity, mitigate the climate change impacts, establish coastal green belt, protect ecosystems. Activities taken by the BFD to conserve Forest, Wildlife and Biodiversity:

- According to the Tiger Conference, St. Petersburg, Russia's (2010) international declaration, appropriate initiatives have been taken to increase the number of tigers in the Sundarbans by stopping deer hunting, habitat improvement and regular patrolling to increase the number of tigers and deer in the Sundarbans. According to the results of tiger estimation, tigers has been increased from 106 to 114 from 2015 to 2016. Besides, the Tiger Action Plan (2018-2027) has been prepared for the conservation of tigers. Third tiger estimation is ongoing under a project in the Sundarban Reserved Forests and the result will be published in 2023-24.
- A total of 35 protected areas including 9 National Parks, 18 Wildlife Sanctuaries, 3 Ecoparks, 1 Botanical Gardens, 2 Marine Protected Area (Swatch of No Ground and St. Martin's) and 2 Special Biodiversity Conservation Areas have been declared for biodiversity conservation from 2010-2011 to till now. At present, the total number of protected areas in the country is 51.
- The Forest Act, 1927 is in the process of being translated into Bengali and amended (2000) into a new law.

- Forest Department gradually formulating the master plans for the Protected Areas along with management plans to conserve the forest, wildlife and biodiversity.
- To conserve forest, wildlife and biodiversity, forest monitoring and crime are being suppressed successfully by introducing SMART (Spatial Monitoring and Reporting Tool) patrolling system in Sundarbans. Formulation of SMART Strategy for the implementation in Sundarbans other protected areas are under development.
- A total of 41,889 wildlife (amphibians, mammals, reptiles and birds) has been rescued and released into the nature so far (July 2012 to till now) through continuous operations by Wildlife Crime Control Unit. Besides, 1405 trophies and 195 criminals were fined and imprisoned and 129 cases has been filed.
- Formulation of co-management committees has been started since 2004 to ensure the participation of local people in the conservation of forests, wildlife and biodiversity. Protected Area Management Rules-2017 have been approved. Therefore, the activities of the co-management are strengthened and the jurisdiction of social forestry has been expanded. As of the rule, 50 percent of the income earned from the entrance fee of the protected areas is being allocated to improve the quality of life of the local people and forest landscape. Recently, forest restoration activities have been continued by involving forest-dependent families adjacent to protected areas and hill and coastal areas through collaborative forest management activities; which, have created Alternative Income Generation (AIG) opportunities for the forest-dependent people.
- Initiatives have been taken to provide the "Prime Minister's National Award" for special achievement in planting trees and the "Bangabandhu Award for Wildlife

Conservation" for nature and wildlife conservation. In addition, World Forest Day, World Wildlife Day, Biodiversity Day, Tiger Day etc. are celebrated.

- **Bangladesh National Herbarium**

Bangladesh National Herbarium (BNH) conducts taxonomic research programs on the plant resources of the country. The main objective of the institute is to collect, classify and preserve all types of vegetation species including agricultural, forest, herb, decaying and threatened plants through field survey. With a view to creating a virtual herbarium, BNH prepares a database of collected plant resources. The organization regularly publishes a booklet 'Flora of Bangladesh' containing information on the plant resources of the country, a journal called 'Bulletin of the Bangladesh National Herbarium', research articles and other floristic books.

To achieve SDG goal-15, BNH has launched two components titled 'Developing Bangladesh National Red List of Plants & Developing Invasive Plant Species (IAPs) Management Strategy for red listing 1,000 plant species the context of Bangladesh and controlling invasive plants in five selected protected forest area's during the period 2020-2023. It is being implemented under the Forest and Livelihood (*Sufal*) scheme. A total of 979 plant species have been evaluated till February, 2023, where in the context of Bangladesh 8 plant species have been identified as Extinct and 280 species as threatened. In addition, with a view to collecting, identifying, preserving of plant specimens and writing an illustrated floristic book the implementation of another development project on *Barisal* and *Sylhet* divisions during 2021-24 is underway. As a part of innovative activities, work is underway to create a digital database for the purpose of creating virtual herbarium with information and images of plant specimens stored on herbarium cupboards. A computer database of

7,861 herbarium specimens has been prepared so far through this program. Besides, BNH has launched a mobile 'Seva App' (<https://mob-app.bnh.gov.bd>) to facilitate the services provided to the customers.

Bangladesh Forest Research Institute

'Bangladesh Forest Research Institute' is the only national research institute for forest and forest resources. The main task of the institute is to develop innovative technology for increasing production of forest resources and better utilisation of these resources. In addition, the institute works for development and expansion of nursery and forestry strategies to retain some extinct plants. At present, the institute carrying out 54 research programs.

BFRI conducted 71 research studies (17 new studies and 54 on-going) in 2022-23. To disseminate research findings and technologies training, workshops/seminars are organised in the field level. Training has been imparted to marginal about planting medicinal plant developed by BFRI. Presently interested people are implementing this trained knowledge and playing vital role to meet the demand of raw material for making medicine. This makes an opportunity of planting medicinal plant commercially. There has been possible to increase the production of raw-material of few pharmaceuticals opportunity of employments and invention of planting and management system of commercially used majors' medicinal plants. Cultivation of medicinal plant's provides an additional source of income to farmers involved in primary health care and contributes to socio-economic development.

Selected mangrove species *Sundari*, *Gewa*, *Passur*, *Kakra*, *Baen*, *Singra*, *Hantal* and *Goalpata* for mixed under plantation in the coastal keora plantation. This created the green belt for mitigation of climate change disaster. These species can survive in the sea tidal and salt water. Besides, in the Bangladesh Sundarbans,

some species like *Dundul*, *Jhana* and *Vatkhati* decline due to climate change and human interferences. The rate of natural growth of seedlings of these species is also decreasing. Research works have been taken for development of nursery and plantation technic of that three species in the *Sundarban*.

Natural Disaster Management

Bangladesh is one of the disaster-prone countries in the world. Every year one or more disasters such as cyclone, flood, flash flood, monsoon storm, tornado, landslide, fire, drought, lightning etc. These disasters include the devastating cyclone of 1970 and 1991, cyclone *Sidar* of 2007, *Aila* of 2009 the *Mahasen* of 2013 and *Amphan* of 2020 and the horrific floods of 1988, 1998, 2004 and 2007. The Ministry of Disaster Management and Relief has been making significant contributions to the disaster risk reduction and post-disaster rehabilitation activities for the people of the country. "The disaster management vision of the Government of the People's Republic of Bangladesh is to reduce the risk of people, especially the poor and the disadvantaged, from the effects of natural, environment and human induced hazards to a manageable and acceptable humanitarian level and to have in place an efficient emergency response management system." The Ministry of Disaster Management and Relief has been given the mandate to drive national risk reduction reform programmes. Its mission relative to this agenda is: "To achieve a paradigm shift in disaster management from conventional response and relief to a more comprehensive risk reduction culture, and to promote food security as an important factor in ensuring the resilience of communities to hazards".

Some important measures taken by the ministry has been shown briefly as follows:

Steps for Action, Laws, Rules and Regulations

- The ministry of disaster management and relief has formulated the National Strategy on Internal Displacement Management-2021 to develop policies, guidelines and action plans to reduce the rate of displacement due to climate change and disasters and to adopting measures of their overall human development. It will also provide security to vulnerable communities at risk of internal displacement and to create an enable environment for their safe livelihood in development activities and to ensure return of their former habitat with dignity to resettlement.
- Standing Orders on Disaster (SOD) 2019 has been published for proper implementation of the responsibility and duties of all ministries, divisions, departments, organisations and individuals related to disaster management and to prepare their own action plans. Such permanent orders also include disasters such as earthquake, tsunamis and fire incidents alongside other common disasters. SOD has been modified including thunderbolt as disaster and incorporating Ward Disaster Management Committee.
- Disaster Management Act 2012 has been formulated to provide proper legal framework for ensuring the effective management of disaster and institutional recognition of management of disaster risk, preparation and implementation of national and local planning, protection of life, property and fundamental rights of the people at risk of disaster.
- Bangladesh has been a member of the Asian Disaster Reduction Center (ADRC), Regional Integrated Multi-Hazard Early Warning System (RIMES), Asian Ministerial Conference on Disaster Reduction (AMCDR) and INSARAG (International Search and Rescue Advisory Group).

- Disaster Management (Management of Funds) Rules-2021 have been framed;
- Disaster Management Research Guideline-2020 has been published;
- Post Disaster Dead Body Management Guideline, 2016 is published; and
- National Disaster Management Policy 2015 has been published.

Steps Related to Planning

- The ministry of disaster management and relief has formulated Action Plan (2022-2042) to implement National Strategy on Internal Displacement Management. In action plan Climate change adaptation program and construction of disaster-resilient infrastructure has been incorporated to reduce disaster risk to vulnerable communities. Besides, emphasis has been given on emergency humanitarian assistance and post-disaster relief assistance for protection. Further, post-displacement management activities have been brought under the sustainable solutions thematic plan. Moreover, the scope of work of various departments and ministries of the government has been determined for the implementation of the plan.
- National contingency plan has been created for rapid transition from the post-disaster situation including earthquake. Contingency plans of rapid responding organisations like Fire Service and Civil Defense Department, Armed Forces' Division, Department of Disaster Management, Cyclone Preparedness Program (CPP), Dhaka, *Chattogram* and *Sylhet* City Corporation and various health services providing organisations like Power, Titas, T & T and of WASA have been done.
- Ministry of Disaster Management and Relief is helping to prepare the SAARC Plan of Action for Disaster Management by

coordinating disaster management policy and planning of SAARC member countries.

Preparation of guidelines on Incident Management System (IMS) in Bangladesh is at final stage for effective disaster management. Moreover, Debris Management Plan for *Dhaka, Chattogram* and *Sylhet* city has also been finalised for the removal of post-earthquake debris.

Urban Volunteer Management Guidelines 2019 has been published;

The Sendai Framework Implementation Plan for Disaster Risk Reduction has been completed and

- National Disaster Management plan has been formulated for disaster risk reduction.

Awareness and Educational Steps/Measures

- Disaster Management Chapter has been added to the textbook from three to ten class to increase the awareness of students about disaster.
- Disaster Management and Climate Change has been incorporated in the training curriculum of a total of 41 educational and training institutes for the creation of skilled manpower for disaster management and climate change. In the meantime, *Dhaka University, Rangpur Begum Rokeya University, Patuakhali University of Science and Technology* and *Bangladesh University of Professionals* have started Diploma and Masters courses on Disaster Management and Climate Change. So far, Masters/ Diploma courses in Disaster Management have been introduced in 28 Universities.
- Harmonized Training Module and training guidelines for trainers and trainees have been prepared with a view to bring equality and coordination in the training activities of public and private (NGO) organizations.

Damage and Need Assessment (DNA) Cell has been set up under ECRRP-D1 project and

District Relief and Rehabilitation Officers and *Upazilas* Project Implementation Officers of 64 districts of the country have been provided training on Damage and Need Assessment (DNA) software for filling in SoS and D-Form Online.

Multi Hazard Risk and Vulnerability Assessment (MRVA) Cell has been set up under ECRRP-D1 project. Risk maps have been prepared and uploaded on the website of 8 major types of disasters (flood, cyclone and tidal wave, earthquake, tsunami, landslide, drought, technical and health) across the country.

- Under the National Institute for Disaster Management and Training, 4,023 people have been trained in FY 2021-22 and training is ongoing in FY 2022-23.

Use of Information and Communication Technology to reduce the risk of disaster

- **Use of IVR (Interactive Voice Response) technology:** Disaster advance messages are being disseminated through mobile phones in an understandable language using Interactive Voice Response (IVR) method.

DNA (Damage and Need Assessment) software: It is important to know the damage information for rehabilitation planning in the post-disaster period. But there is a delay in getting this information from the field. To this end, a web based DNA software has been developed for the rapid transmission and analysis of disaster damage information through online. The software also includes Citizen Reporting so that people can send information and pictures about the *Elkar* disaster online. At present training of District Relief and Rehabilitation Officers, *Upazilas Nirbahi* Officers and *Upazilas* Project Implementation Officers is being conducted at the field level on the use of this software. Through this software online damage

information can be sent directly from the *upazilas*.

Establishment of the Multi Hazard Risk and Vulnerability Assessment, Modeling and Mapping (MRVA) Cell: MRVA Cell has been established under the ECRRP 2007-D1 project in Disaster Management Department. This cell has prepared a map of various calamities, risks and hazards. Using these maps can be taken to reduce the risk of disaster planning, and if it is implemented properly, further disaster damage will be reduced in the future. The products of MRVA have been published on the Disaster Management Department's website.

Cyclone Shelter Database: Detailed information about cyclone shelters built in coastal areas is stored in the website based database. This database stores structural and ancillary information of shelters such as: geographical location (latitude / longitude), usability, capacity, etc. The data from this database can be used to determine the exact location of new cyclone shelters, to determine the appropriate route to bring people to shelters during cyclones, and to determine the need for shelter management and repairs.

E-Library: An electronic DMKP has been created to make all publications on disaster and disaster management available in one place. So far there are about 1,000 disaster related publications stored in the e-library/DMKP.

Risk Atlas (a comprehensive database of hazard maps, overviews of risk indicators, various at-risk organizations, infrastructure, etc.): Risk Atlas provides all the information needed to analyse the risk maps of a particular *upazilas*, including disaster information such as floods. Depth and circumference, depth and circumference of tidal wave, drought image and perimeter and danger etc.

Significant ongoing development project:

Construction of bridge/culvert up to 15m in rural roads: In 490 *upazilas* of 64 districts of the country, with the aim of providing quick and easy travel to shelters during disasters, development of water drainage system and elimination of waterlogging in rural roads, establishment of communication with educational institution, *haat-bazar* and support in transportation and marketing of agriculture products and construction of 1,56,000 meters bridge/culvert is in progress.

Disaster Risk Management Enhancement Project (Funded by JICA):

The main activities of the projects to purchased various equipment's such as HF Base Set, 40Ft Tower for HF Base Station, first aid kit box, stretcher, siren, radio set, life jacket, megaphone and 12 water rescue boats. This equipment's will be supplied to 35 *upazilas* to support emergency rescue operations during disasters.

Construction of District Relief godown cum Disaster Management Information Center:

Construction of 65 district relief godown cum disaster management information centers in 64 in districts is underway to increase capacity in emergency response and provide district-wise relief materials during disasters.

Construction, renovation and development of Mujib killa project:

Under this project, 505 *Mujib killas* are being constructed in 232 *upazilas* in 38 districts of the country to provide shelter to people and livestock and to protect the valuable resources of people.

Construction of HHB road in rural area to sustain earthen road:

Construction of 5200 km of HBB roads in 490 *upazilas* of 64 districts of the country for the purpose to reducing of disaster risk and easy travels to shelters during disasters and establishing communication with educational

institutions, *haat-bazaar* and providing support in transportation and marketing of agricultural products.

Construction of Flood shelters in river erosion and flood prone area (3rd Phase):

423 flood shelters will be constructed in 247 *upazilas* of 42 districts to reduce disaster risk and to protect lives, animals and vital resources of poor communities in flood prone and river erosion areas.

Social safety net programme:

Rural Infrastructure Reform Programme (FFW-Foodgrain/cash): MoDRM is implementing the Rural Infrastructure Reform Programme (FFW-Food grain/cash) with the purpose of creating employment and ensuring food security for the poor people in rural areas and to keep positive impact on poverty alleviation and disaster risk reduction. In FY 2022-23, a total of tk 1,500 crore has been allocated in *kabita* (cash for work) budget and 1 lakh tons of rice and 1 lakh tons of wheat for *kabikha* (food for work) budget.

Maintenance of Rural Infrastructure (TR-Food grains/Cash) Programme: This programme is implemented with the aim of ensuring social security and food security in disaster risk reduction and adaptation to climate change and creating employment for the poor in rural areas and creating a positive impact on poverty alleviation and disaster risk reduction. Under this programme, a total tk of 733.33 crore has been allocated in FY 2022-2023.

The Employment Generation Programme for the poorest people (EGPP): The Programme is one of the largest social safety net programmes of the Government of the People's Republic of Bangladesh, implemented by the Department of disaster management under the Ministry of Disaster Management and Relief. The program plays a significant role in construction/repair/renovation of rural infrastructure including

capacity building for poverty alleviation and disaster risk reduction by generating of short-term employment during the non-working season of the year. Under this programme, out of the total budget allocation of 2,146.54 crores in FY 2022-23, 1,073.27 crores have been allocated in the 1st face.

Vulnerable Group Feeding (VGF): The Department of Disaster Management under the Ministry of Disaster Management and Relief is implementing the programme. This assistance is usually given to the affected families until the livelihood of the poor people is restored in the post-disaster period. Each family is given 20-40 kg per month for 2 to 5 months.

Emergency Humanitarian Assistance Program (GR): Under this programme, in FY 2022-23 4971.00 M.T of food grains and 795.50 lakh Tk. have been allocated in the budget.

Water Development Board to Combat Climate Change Risk and Disaster Management

To tackle the climate change effects and natural disasters, BWDB has taken different projects under Bangladesh Climate Change Trust Fund (BCCTF). To address the effects of climate change, Bangladesh Water Development Board, with funding from the Climate Change Trust Fund, has completed 130 projects from 2009-10 to February, 2023 at a cost of taka 1,061.08 crore. Implementation of 6 projects at a cost of Taka 40.43 crore is in progress. These projects are related to construction / repair of polders / dams in coastal chars, construction of cross dams for land reclamation, river bank protection, re-excavation of rivers / canals, afforestation. Due to flood control, protection of saline water intrusion, removal of water logging, availability of water, effective water management, the livelihood of beneficiaries of the project areas has been improved and adaptation capability has been increased to combat adverse effects of climate change.