Centre for Governance Studies

Overview of Bangladesh's NDC at COP26

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The government of Bangladesh signed the Paris Climate Accords on 22nd April 2016. The clauses of the agreement were put into force by 4th November of the same year. According to the Paris Agreement, each member country is to outline and communicate their post-2020 climate actions, known as their Nationally determined contributions (NDCs).

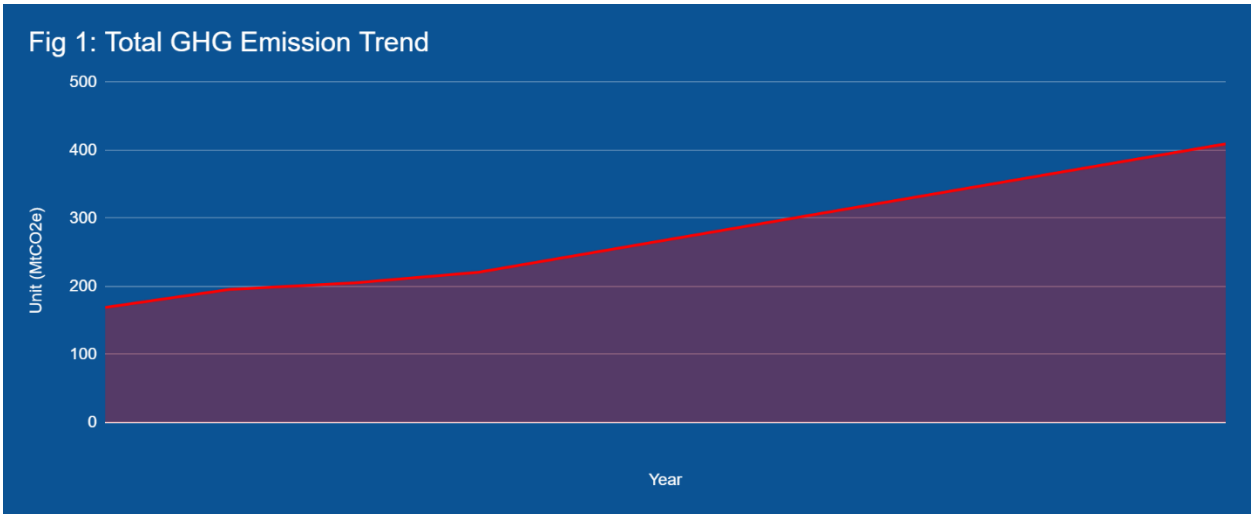
The sole aim of the Paris Agreement (PA) is to change the current course towards combating climate change, harbouring a sustainable development pathway by limiting global warming within 1.5 - 2 degrees Celsius above pre-industrial levels. One of the key elements of the PA is the Nationally Determined Contributions (NDCs) previously referred to as Intended Nationally Determined Contributions (INDCs) before the ratification of PA. Bangladesh submitted its first INDC to UNFCCC on 25 September 2015, for three sectors (Power, Industry and Transport). Subsequently, Bangladesh prepared the NDC Implementation Roadmap and Action Plan in 2018.

This year, Bangladesh submitted its updated NDC which covers **Energy** (Power, transport, energy use in industry, residential, commercial, agriculture and brick manufacturing, F-gases and Fugitive emission), **Industrial Processes & Product Use (IPPU)**, **Agriculture, Forestry and other Land use (AFOLU)** and **Waste sectors**. With the submission of the new NDCs, we have now access to a plethora of climate data to analyse and predict Green House Gas (GHG) emission trends in Bangladesh.

NDC Base year and projection scenarios

For the NDC update, 2012 has been considered for the base year following the Third National Communication of Bangladesh, detailing a comprehensive national GHG emission inventory for 2012. Energy, IPPU, AFOLU and Waste Sectors were considered for GHG emission inventory preparation.

It is stated in the NDC submission that in 2012 total GHG emission accounted for 169.05 million tons CO2 equivalent (MtCO2e). The Energy Sector held the highest contribution to the total GHG emission at 93.09 Mt CO2e or 55.07% of the total emission. Following that, the AFOLU sector contributed 27.35% of the total, Waste contributed 14.26%, and IPPU contributed 3.32%.

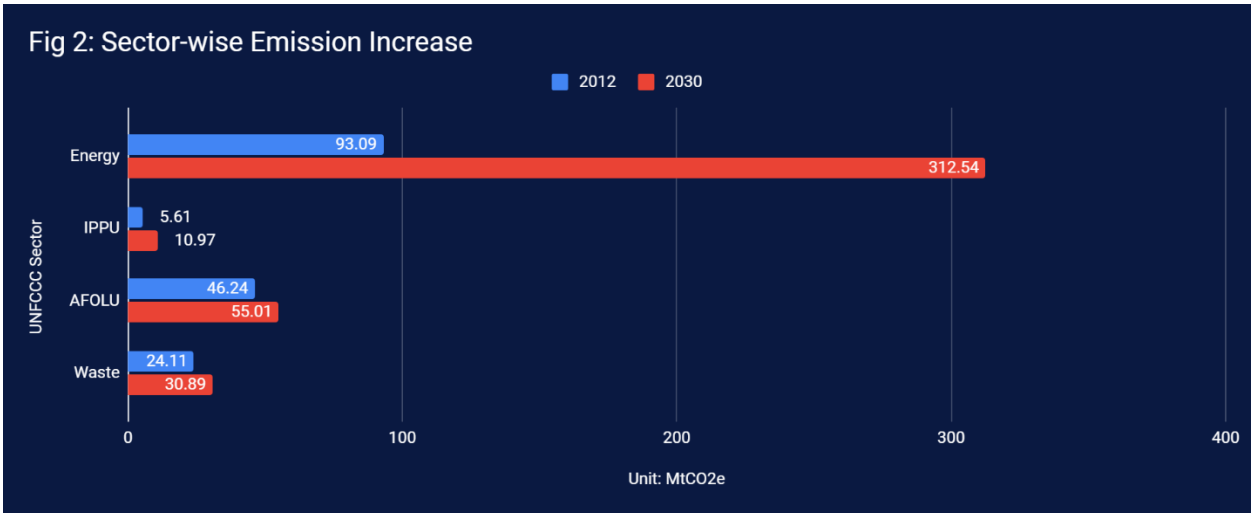


The NDC submission also provides an estimation of the level of GHG emissions Bangladesh might have in 2030. Fig 1 shows the estimated trend of GHG emissions in Bangladesh according to data from the NDC and the World Bank.

There are three main scenarios under which GHG emission levels in 2030 are projected in the report. They are:

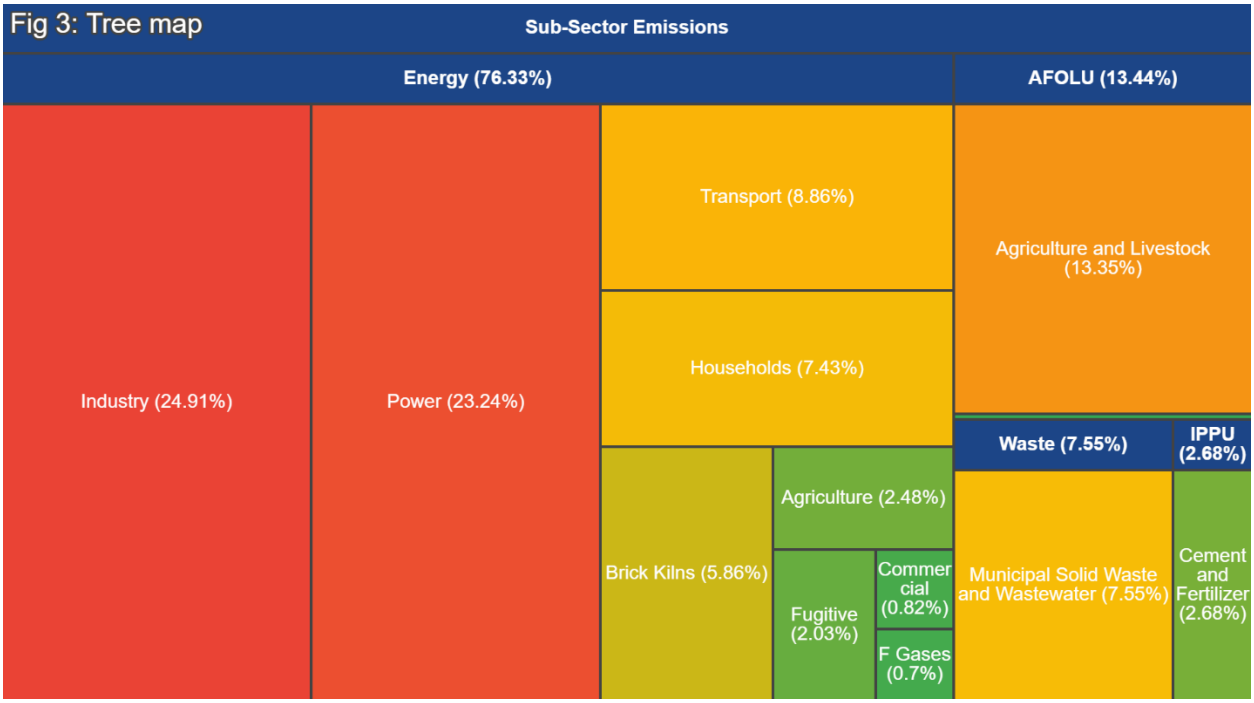
- The Business as Usual scenario (BAU)
- The unconditional mitigation scenario
- The conditional mitigation scenario

The first is the Business as Usual (BAU) scenario which is prepared considering the contribution of emission sources and information collected from the relevant agencies of different ministries following the IPCC 2006 reporting guidelines. In this scenario, **Total GHG emission is found to be increased from 169.05 Mt CO2e in 2012 to 409.4 Mt CO2e in 2030 under the BAU scenario** with an increase of 2.4 times than base year. This scenario represents the projected GHG emission levels if no mitigation action is taken. Fig 2 shows the sector-wise emission increase presented in the NDC submission:



As shown in Fig 2, the sector-wise emissions under the BAU scenario by 2030 are 312.54 Mt CO2e (76.34% of total) in Energy; 10.97 Mt CO2e (2.68% of total) in IPPU; 55.01 Mt CO2e (13.44% of total) in AFOLU; and 30.89 Mt CO2e (7.55% of total) in Waste Sectors.

The highest contribution (24.91% of total) of GHG emission is found for Industry (energy) subsector followed by Power (23.24% of total) and Transport (8.86% of total) under the Energy Sector. A detailed breakdown of emissions by subsectors is provided in Fig 3:



The second scenario is the Unconditional Mitigation Scenario. In the unconditional scenario, GHG emissions would be **reduced by 27.56 Mt CO2e (6.73%) below BAU in 2030** in the respective sectors. 26.3 Mt CO2e (95.4%) of this emission reduction will be from the Energy sector while 0.64 (2.3%) and 0.6 (2.2%) Mt CO2e reduction will be from AFOLU (agriculture) and waste sector respectively. There will be no reduction in the IPPU sector.

The third is the Conditional Mitigation Scenario. In the conditional scenario, GHG emissions would be **reduced by 61.9 Mt CO2e (15.12%) below BAU in 2030** in the respective sectors. This reduction is in addition to the proposed reductions in the unconditional scenario. The conditional mitigation measures will be implemented by Bangladesh, only if there is external financial/technology support. The conditional scenario has 59.7Mt CO2e (96.46%) emission reduction from the Energy sector, while 0.4 (0.65%) and 1.84 (2.97%) Mt CO2e reduction will be from AFOLU (agriculture) and Waste Sector respectively. There will be no reduction in the IPPU Sector. Fig 4 shows the estimated GHG reduction under unconditional and conditional scenarios:

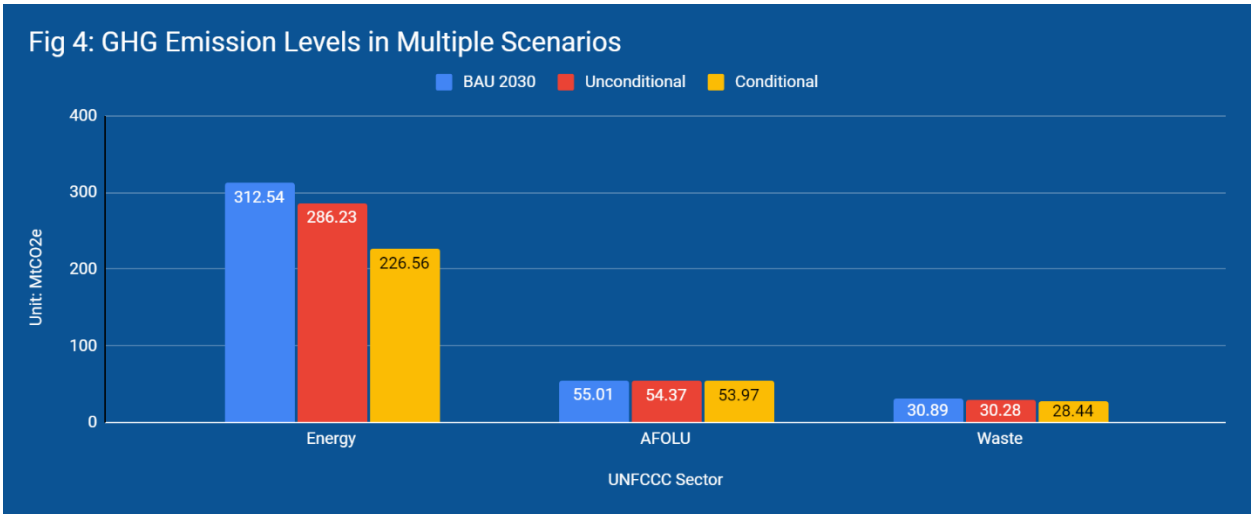
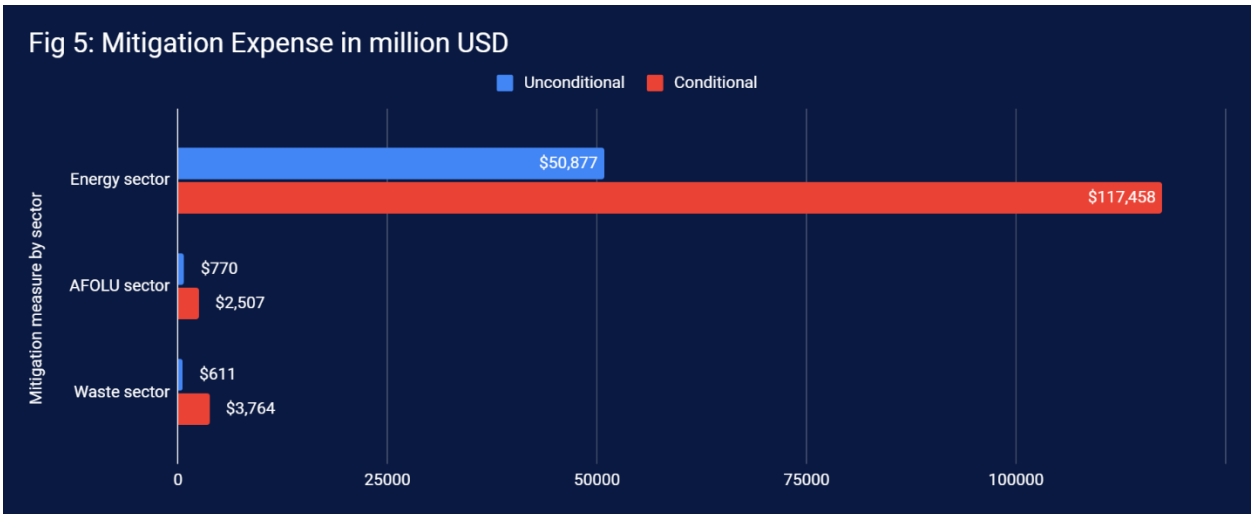


Fig 5 shows the estimated cost difference in implementation between the unconditional and conditional mitigation actions:



Mitigation Actions:

Unconditional Scenario	Conditional Scenario
Energy Sector	
Power	
Implementation of renewable energy projects of 911.8 MW	Implementation of renewable energy projects of 4114.3 MW
Grid-connected Solar-581 MW, Wind-149 MW, Biomass-20 MW, Biogas-5 MW, New Hydro-100 MW, SolarMini-grid-56.8 MW	Grid-connected Solar-2277 MW, Wind-597 MW, Biomass-50 MW, Biogas-5 MW, New Hydro-1000 MW, SolarMini-grid-56.8 MW, Waste to Electricity- 128.5 MW
Installation of new Combined Cycle Gas based power plant (3208 MW)	Coal power plant with Ultra supercritical technology- 12147 MW

Efficiency improvement of Existing Gas Turbine power plant (570 MW)	Installation of new Combined Cycle Gas based power plant (5613 MW)
Installation of prepaid meter	Efficiency improvement of Existing Gas Turbine power plant (570 MW)
	Installation of prepaid meter
	Bring down total T&D loss to a single digit by 2030
Transport	
Improvement of road traffic congestion (5% improvement in fuel efficiency)	Improvement of road traffic congestion (15% improvement in fuel efficiency)
Widening of roads (2 to 4 lanes) and improving road quality	Widening of roads (2 to 4 lanes) and improving road quality
Construct NMT and bicycle lanes	Construct NMT and bicycle lanes
Electronic Road Pricing (ERP) or congestion charging	Electronic Road Pricing (ERP) or congestion charging
Reduction of private cars and encourage electric and hybrid vehicles	Reduction of private cars and encourage electric and hybrid vehicles
Development of Urban Transport Master Plans (UTMP) to improve transport systems in line with the Urban Plan/ City Plan for all major cities and urban area	Development of Urban Transport Master Plans (UTMP) to improve transport systems in line with the Urban Plan/ City Plan for all major cities and urban area
Introducing Intelligent Transport System (ITS) based public transport management system to ensure better performance, enhance reliability, safety and service	Introducing Intelligent Transport System (ITS) based public transport management system to ensure better performance, enhance reliability, safety and service
Modal shift from road to rail (10% modal shift of passenger-km through different Transport projects such as BRT, MRT in major cities, Multi-modal hub creation, Padma Bridge etc.	Establish charging station network and electric buses in major cities
Purchase of modern rolling stock and signalling system for railway	Modal shift from road to rail (25% modal shift of passenger-km) through different Transport projects such as BRT, MRT in major cities, Multi-modal hub creation, new bridges etc.
Electrification of the railway system and double-track construction	Purchase of modern rolling stock and signalling system for railway
Improved and enhanced Inland Water Transport (IWT) system (Improve navigation for regional, sub-regional, and local routes, improve maintenance of water vessel to enhance engine performance, introduce electric water vessel etc.)	Electrification of the railway system and double-track construction
	Improved and enhanced Inland Water Transport (IWT) system (Improve navigation for regional, sub-regional, and local routes, improve maintenance of water vessel to enhance engine performance, introduce electric water vessel etc.)

Industry	
Achieve 10% Energy efficiency in the Industry sub-sector through measures according to the Energy Efficiency and Conservation Master Plan (EECMP)	Achieve 20% Energy efficiency in the Industry sub-sector through measures according to the Energy Efficiency and Conservation Master Plan (EECMP)
	Promote green Industry
	Promote carbon financing
Agriculture	
Implementation of 5925 Nos. solar irrigation pumps (generating 176.38MW) for agriculture	Implementation of 4102 Nos. solar irrigation pumps (generating 164 MW) for agriculture
Brick Kilns	
14% emission reduction through Banning Fixed Chimney kiln (FCK), encourage advanced technology and non-fired brick use	47% emission reduction through Banning Fixed Chimney kiln (FCK), encourage advanced technology and non-fired brick use
Residential and Commercial	
Use energy-efficient appliances in household and commercial buildings (achieve 5% and 12% reduction in emission respectively)	Use energy-efficient appliances in household and commercial buildings (achieve 19% and 25% reduction in emission respectively)
F-Gases	
Reduction of Ozone Depleting Gases (HCFCs) use in air conditioning as per Montreal protocol targets by 2025	Reduction of Ozone Depleting Gases (HCFCs) use in air conditioning after 2025.
Fugitive Emission	
N/A	51% emission reduction from Gas leakage through CDM projects
Forestry	
Increase forest cover.	Maintain the forest cover and tree cover through collaborative forest management, social forestry and other programs.
Increase tree cover from 22.37% (2014) to 24%.	Forest conservation by Scale-up of alternative income-generating activity for forest-dependent communities- 55,000 nos. families
Afforestation and reforestation in the coastal areas, islands and degraded areas – 150,000 ha.	Co-management in Protected areas -72,000 ha
Restore the deforested forests – 137,800 ha at the hill and plain land sal forest.	Additional coastal afforestation activities.
Restore the degraded forests – 200,000 ha at the hill and plain land sal forest.	Maintain the restoration of degraded or deforested areas.

Plantation in roadsides, embankments, private lands etc.	Plantation in roadsides, embankments, private lands etc.
AFOLU Sector	
Agriculture	
Methane emission reduction from Ricefield:	*Methane emission reduction from Ricefield*
- Upscaling Alternate Wetting and Drying (AWD) in dry season rice field in 50,000 ha of croplands	- Upscaling Alternate Wetting and Drying (AWD) in dry season rice field in 100,000 ha of croplands
- Rice Varietal Improvement for 1,111,000 ha croplands	- Rice Varietal Improvement for 2,129,000 ha croplands
Nitrous Oxide emission reduction from nitrogen-based Fertilizer:	*Nitrous Oxide emission reduction from nitrogen-based Fertilizer:*
- 209,000 ha cropland Management (leaf colour chart, soil test based fertilizer application, less tillage barn management etc.)	- 627,000 ha cropland Management (leaf colour chart, soil test based fertilizer application, less tillage barn management etc.)
- Improvement of fertilizer management (deep placement of urea in rice field, training, awareness) in 50,000 ha	- Improvement of fertilizer management (deep placement of urea in rice field, training, awareness) in 150,000 ha
- Bringing more area under pulse cultivation	- Bringing more area under pulse cultivation
Methane emission from Enteric Fermentation:	*Methane emission from Enteric Fermentation:*
- Replacement of low-productive animals with high producing crossbred cattle (Large Ruminant – 0.94 million and Small Ruminant – 0.89 million)	- Replacement of low-productive animals with high producing crossbred cattle (Large Ruminant – 1.882 million and Small Ruminant – 1.776 million)
- Feed improvement by using a balanced diet and beneficial micro-organisms for livestock (Large Ruminant – 0.51 million and Small Ruminant – 0.68 million)	- Feed improvement by using a balanced diet and beneficial micro-organisms for livestock (Large Ruminant – 1.013 million and Small Ruminant – 1.355 million)
Methane and Nitrous Oxide emission from Manure management:	*Methane and Nitrous Oxide emission from Manure management:*
- Improved manure management through promotion of mini biogas plants (57,000 nos.)	- Improved manure management through promotion of mini biogas plants (107,000 nos.)
- Awareness and training programme	- Awareness and training programme
Waste Sector	
- Establishment of Waste to Energy plant in Dhaka	- Establishment of Incineration plant in 3 Cities

- Establishment of Incineration plant in one City	- Implementation of wastewater treatment plants in several cities
- Regional Integrated Landfill and Resource Recovery Facility in One City	- Expansion of Regional Integrated Landfill and Resource Recovery Facility in other cities

Adaptation actions:

Sustainable Ecosystem and Livelihood

Bangladesh Forest Department (BFD) is currently implementing the Sustainable Forests & Livelihoods Project (SUFAL) supported by World Bank, to improve forest management and increase benefits for forest-dependent communities in targeted sites by financing nearly 79,000 hectares of forests on public and private lands, including about 22,000 hectares of coastal green belt across 147 Upazilas (sub-districts). The project emphasizes sustainable livelihood options for the forest-dependent communities and engages them in ecosystem management to ensure the sustainability of the forest resources. Some of the completed projects for sustainable ecosystem management are- Climate Resilient Ecosystem and Livelihoods (CREL), Integrating Community-based Adaptation into Afforestation and Reforestation Programme in Bangladesh and Climate Resilient Participatory Afforestation and Reforestation Project (CRPARP). These projects helped reduce forest degradation and to build the long-term resilience of selected communities to climate change.

Disaster Management

The Coastal Embankment Improvement Project (CEIP) has helped Bangladesh mitigate some of the most significant impacts of cyclones and flooding and enhanced emergency response in the coastal region. The project costs US$ 400 million and is supported by the Pilot Program for Climate Resilience (PPCR), a targeted fund within the Climate Investment Funds (CIF) framework. Since 2013, the project has increased the protection of 183,900 people including 91,950 women with increased resilience to climate change in selected regions from tidal flooding and storm surges. As of May 2019, the project has protected 21,700 ha of gross area and upgraded 130.58 km embankment. A comprehensive analysis is being undertaken to understand the coastal dynamics better and increase climate resilience in the coastal area. Other relevant programs that have been implemented over the last decade are National Resilience Programme, Project for Enhancing Capacity on Planning and Implementation of Regional Disaster Risk Reduction, Information Management System for Disaster Risk Management, Enhancing the Capacity of CPP Volunteers and Coastal fisherman to Cope with Climate Change, Construction of Multipurpose Cyclone Shelters in Coastal Areas and Construction of Flood Shelter in Flood Prone Areas across the Country and Comprehensive Disaster Management Programme II.

Agriculture and Food Security

The Ministry of Agriculture, Ministry of Fisheries and Livestock and Ministry of Food have contributed to climate change adaptation through the activities related to, research and education program; agricultural extension and training; production, standardization, certification, preservation and distribution; support and rehabilitation; minor irrigation programs; and improved value chain. The ministries have initiated many investment projects/programmes which focus mainly on increasing food productivity and sustaining growth in the face of the adverse effect of climate change. Some of the notable projects are- National Agricultural Technology Program-Phase II Project (NATP-2), support to seaweed cultivation, processing and marketing through assessment and capacity development, Enhanced Coastal Fisheries (ECOFISH BD), Community-based Climate Resilient Fisheries and Aquaculture Development in Bangladesh, Inclusive agriculture and agro-industrial value chain development as an enabler of poverty reduction in Bangladesh, South West Region Livestock Development Project, Establishment of Regional Duck Breeding Farm along with Hatchery (3rd Phase), Scavenging Poultry Conservation and Development Project, and Establishment of Fish Landing Centers in Haor Area, Institutionalization of Food Safety in Bangladesh for Safer Food, Construction of new food storage, and Modern Food Storage Facilities.

Water Resources Management

Ministry of Water Resources has a major function in addressing the adverse impacts of climate change. Through its recent activities, the Ministry has directly contributed to climate change adaptation. Projects strongly relevant to climate change under this Ministry include Char Development and Settlement Project-4, flood control and drainage improvement for removal of drainage congestion in Noakhali area, climate-smart agricultural water management, and planning for flood management in Bangladesh (the Ganges and Brahmaputra Basin), Blue Gold Program for Water Management and Environmental Development. Re-excavation of small rivers, canals and water bodies in 64 districts (1st phase) etc. A total of 726 km river bank protection, 2,123 km river excavation and dredging, 1,266 km embankment, excavation/ re-excavation of 181 km irrigation canal and 499 km drainage canal, 2.58 million ha land reclamation from rivers and estuary areas in the last 10 years have been done. One million trees have been planted in the embankments, river/canal banks to mitigate carbon emission, and 2725.1 ha marshlands were rehabilitated and included in fisheries culture to enhance livelihood activities by the Ministry of Livestock and Fisheries.

Surface Water Use and Rainwater Harvesting

Several city water supply authorities are implementing projects to increase surface water use and reduce groundwater use. These projects will reduce energy consumption for pumping groundwater and contribute to GHG emission reduction. Dhaka WASA has implemented three plants supplying 913 million litres per day (MLD) drinking water and 950 MLD capacity will be added from two plants under implementation. Similarly, Rajshahi WASA and Khulna WASA are implementing a 200 MLD capacity plant and 0.78 million cubic metre capacity reservoir.

Implementation Challenges and Barriers

Some of the key implementation challenges identified during the NDC update are as follows:

- Lack of knowledge and awareness about NDC and mitigation among many relevant sector officials. An extensive awareness campaign on mitigation and NDC will be needed to overcome this.

- There is a lack of basic data collection regularly for industries, transport, agriculture, forestry and waste. Studies need to be conducted periodically to overcome this.

- As the mitigation actions mostly require a large amount of money to successfully implement them, financial support from different agencies, banks, bilateral or multilateral funds will be needed.

- As Bangladesh is a small country with a high population, food security is a significant issue. Rice is the primary staple crop of Bangladesh and there is a growing concern among the sector related community regarding emission reduction activities from rice fields. The updated NDC incorporated a minimal emission reduction from rice fields. Further research and technology transfer at the field level will be required to enhance emission reduction from the rice field.

- The growing need for land for human settlement, agriculture, industries, and timber and fuelwood is mainly responsible for deforestation and forest degradation. Most forest loss can be attributed to overpopulation, poverty and unemployment, and governance. Governance impacts all forest types and specifically included problems related to uncertainty in land tenure and lack of capacity to implement forestry-related management, policies, and law enforcement. In turn, these indirect drivers lead to a suite of direct drivers of deforestation, namely uncontrolled encroachment from industrialization and agriculture and illegal logging. So, the maintenance of existing forest land is of great concern.

- Sustainable management of the forest land and restoration of degraded/ deforested land will require substantial financial support. Collaborative management of forest areas with forest-dependent communities can be an effective solution to reduce degradation.