Ministry of Environment, Forest and Climate Change

Nationally Determined Contributions (NDCs) 2021

Bangladesh

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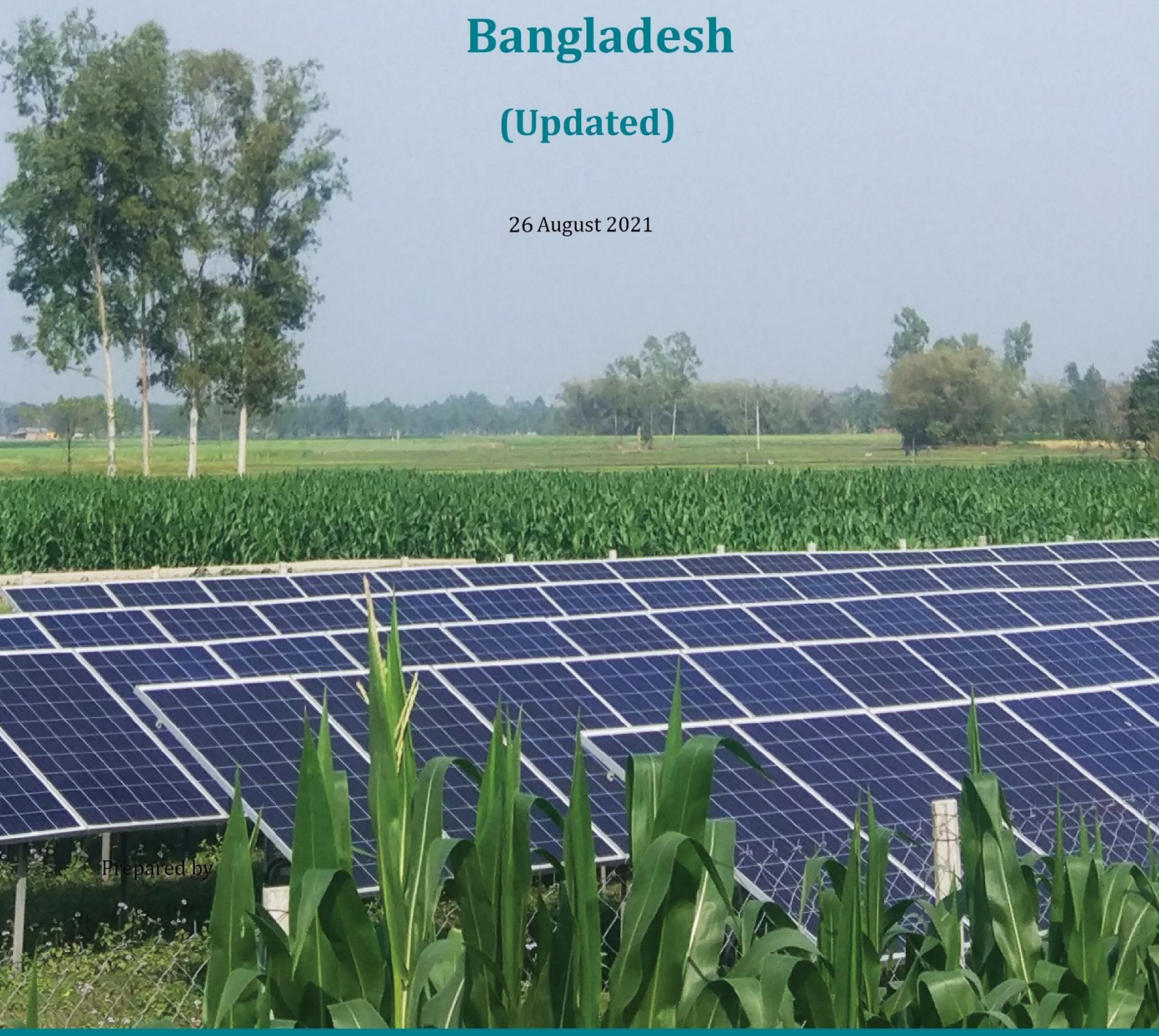

Prepared by

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Introduction

The Paris Agreement (PA) was adopted by COP21 in 2015, and subsequently signed and ratified by 191 Parties. The sole aim is to change the current course towards combating climate change, harboring 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 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.

Bangladesh's INDC proposed for 12 million tons (5%) unconditional reduction in GHG emission from Business as Usual (BAU) scenario by 2030 and a further 24 million tons (10%) conditional reduction in GHG emission with support from the international community taking the base year 2011.

As part of the global initiative, Bangladesh is updating the NDC incorporating additional sectors following IPCC guidelines. The updated NDC covers Energy, Industrial Processes and Product Use (IPPU), Agriculture, Forestry and other Land use (AFOLU) and Waste. For the NDC update, 2012 has been considered as the base year following the Third National Communication of Bangladesh, which details a comprehensive national GHG emission inventory for 2012.

In this NDC update, information to facilitate clarity, transparency and understanding of Bangladesh's NDC in line with the guidelines set out in Katowice decisions (COP24/CMA1) is presented in the form of template in the last part of this document.

The NDC update aims to further mitigation actions that Bangladesh may take to tackle its growing emissions and play its role in global efforts. The NDC calls for a number of mitigation actions that will help limit the country's GHG emissions. These actions will play a key role in realizing the move to a low-carbon, climate-resilient economy and becoming a middle-income country whilst ensuring that it will not cross the average per capita emissions of the developing countries.

Base Year and Future Emission Scenario

As part of the global initiative, Bangladesh is updating its NDC. This updated NDC 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. In this aspect, the NDC is incorporating additional sectors according to IPCC guidelines to ensure comprehensive coverage. So, the Updated NDC tries to represent an economy-wide GHG emission reduction taking in to account lack of required information under AFOLU. The updated NDC is prepared following a structured process involving stakeholders from relevant ministries and agencies. The required data has been collected through IPCC suggested structured template from the agencies on present condition and future plans and projects relevant to GHG emission reduction. Following this, the initial scenario analysis outcomes have been validated with the relevant ministries and agencies in a validation workshop. The possible mitigation measures have been finalized based on discussion on the validation process.

Base Year Scenario

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 are considered for GHG emission inventory preparation.

Power, Transport and Industry are three major sub-sectors under the Energy Sector, while Brick manufacturing, Residential and commercial buildings (energy use), Energy use in Agriculture activities (pumps, tractors, harvester etc.) and fish farms, F-gases (HCFC use) in air conditioning and

refrigeration and Fugitive emission from gas transmission and distribution systems, flaring in oil/ gas fields etc. are considered as other sub-sectors of the Energy Sector.

The Power sub-sector includes emissions from electricity generation activities from coal, gas, furnace oil-based power plants and different renewable energy sources such as solar home system, solar park, solar mini & micro grid, rooftop solar and net metering, solar irrigation, hydro, wind, biomass and biogas. Transport sub-sector comprises fuel combustion emission from the road, rail and inland water transport. Industry sub-sector covers energy use in industry covering fuel and electricity use in industrial activities.

The IPPU sector covers industrial process based emissions from cement clinker production and urea fertilizer production. The AFOLU (agriculture) sub-sector covers methane emission from cultivated rice fields, nitrous oxide emission from nitrogen-based fertilizer, methane emission from enteric fermentation of livestock and methane and emission from manure management. The AFOLU (forestry) sub-sector covers emissions from forest areas and carbon stock in Bangladesh. The Waste sector covers methane emission from solid waste disposal and domestic wastewater.

For the base year, total GHG emission accounts for 169.05 million tons CO_2 equivalent ($MtCO_2e$). Energy Sector holds the higher contribution to the total GHG emission which is 93.09 Mt CO_2e or 55.07% of the total, followed by AFOLU (27.35% of total), Waste (14.26% of total) and IPPU (3.32% of total) Sectors.

Power, Transport, Industry, Household and Brick Kilns are five major sub-sectors which contributes most (total 82.62 Mt CO_2e) to the Energy Sector emission. At the same time, Commercial, Agriculture, Fugitive and F-Gases sub-sectors generate the remaining. Similarly, the Agriculture sub-sector under the AFOLU Sector generates the highest 45.87 $MtCO_2e$, about 27.13% of the total GHG emission for the base scenario. According to IPCC guidelines for Forestry sub-sector, Bangladesh has established a Forest Reference Level (FRL) for the historical reference period 2000-2015. The estimated emission from the forestry sector is 1.19 $MtCO_2e$/year, and the estimated removal is 0.81 $MtCO_2e$/year. The net change, FRL, is 0.37 $MtCO_2e$/year. Waste and IPPU Sector generates 24.11 and 5.61 $MtCO_2e$ emission respectively.

The following table 1 presents the sector-wise GHG emission for the Base year scenario.

Table 1: GHG emission in Base Year (2012)

UNFCCC Sector	Sub-Sector	GHG Emission	
		Base year 2012	
		Million Ton CO_2e	In Percentage
Energy	Power	20.98	12.41
	Transport	16.77	9.92
	Industry (energy)	16.47	9.74
	Other energy sub sectors:		
	Households	16.67	9.86
	Commercial	0.45	0.27
	Agriculture	2.73	1.61
	Brick Kilns	11.73	6.94
	Fugitive	4.37	2.58
	F Gases	2.92	1.73

UNFCCC Sector	Sub-Sector	GHG Emission	
		Base year 2012	
		Million Ton CO_2e	In Percentage
Total Energy		93.09	55.07
IPPU	Cement and Fertilizer	5.61	3.32
AFOLU	Agriculture and Livestock	45.87	27.13
	Forestry	0.37	0.22
Total AFOLU		46.24	27.35
Waste	Municipal Solid Waste and wastewater	24.11	14.26
Total Emission		**169.05**	

The base year GHG emission scenario for 2012, has been updated with additional information for Fugitive emission from leakages in the gas distribution network, F-gases, gas and electricity use in households. This information was not included in the TNC. So, there is an increase in total emission from 152.27 $MtCO_2e$ to 169. 05 $MtCO_2e$.

Business As Usual Scenario

The BAU scenario is prepared considering the contribution of emission sources and information that has been collected from the relevant agencies of different ministries following the IPCC 2006 reporting guidelines. The BAU scenario does not contain any mitigative measures. The BAU scenario has been modeled following the use of conventional technology and national projections of development.

Critical assumptions for modelling GHG emission for BAU scenarios are:

- In the energy sector, BAU is prepared following the Power Sector Master Plan (2016) with additional modifications of plans from the Ministry of Power and mineral resources; Energy Efficiency and Conservation Master Plan (2015) for industry, residential and commercial; previous trend-based projection for Transport; Brick sector roadmap and Department of Environment information on Brick manufacturing, National Cooling Action Plan and Montreal protocol targets for F-gases.
- In the IPPU sector, previous trends and demand-based projections have been made.
- In AFOLU sector, BAU is prepared following rice cropping area and livestock population projection for 2030 from relevant Ministries and agencies; Forestry related emission is taken from Bangladesh's Forest Reference Level (FRL) and kept as constant. No mitigation scenario analysis was carried out for Other Land Use.
- BAU is prepared based on the extrapolation of waste generation using urban population estimates (UN data) and waste generation rate (Third National Communication) in the Waste sector.

Total GHG emission is found to be increased from 169.05 Mt CO_2e in 2012 to 409.4 Mt CO_2e in 2030 under the Business as Usual (BAU) scenario with an increase of 2.4 times than base year. The following table 2 presents the sector-wise distribution of the GHG emission for the BAU scenario in 2030.

The sector-wise emissions under BAU scenario by 2030 are 312.54 Mt CO_2e (76.34% of total) in Energy, 10.97 Mt CO_2e (2.68% of total) in IPPU, 55.01 Mt CO_2e (13.44% of total) in AFOLU and 30.89 Mt CO_2e (7.55% of total) in Waste Sectors.

The highest contribution (24.91% of total) of GHG emission is found for Industry (energy) sub-sector followed by Power (23.24% of total) and Transport (8.86% of total) under the Energy Sector.

Table 2: GHG emission in BAU scenario (2030)

UNFCCC Sector	Sub-Sector	GHG Emission	
		BAU 2030	
		Million Ton CO_2e	In Percentage
Energy	Power	95.14	23.24
	Transport	36.28	8.86
	Industry (energy)	101.99	24.91
	Other energy sub-sectors:		
	Households	30.41	7.43
	Commercial	3.35	0.82
	Agriculture	10.16	2.48
	Brick Kilns	23.98	5.86
	Fugitive	8.31	2.03
	F Gases	2.92	0.71
Total Energy		312.54	76.34
IPPU	Cement and Fertilizer	10.97	2.68
AFOLU	Agriculture and Livestock	54.64	13.35
	Forestry	0.37	0.09
Total AFOLU		55.01	13.44
Waste	Municipal Solid Waste and wastewater	30.89	7.55
Total Emission		**409.41**	

Mitigation Action

The mitigation scenario analysis and assessment of achievable but ambitious unconditional and conditional GHG mitigation measures by 2030 for the NDC update has been prepared following IPCC guidelines and stakeholder consultation. In the unconditional part of NDC, only those mitigation measures were considered which would be implemented based on current local-level capacity, and financed through internal resources. Contingent upon international funding and technological support, the conditional emission reduction will be implemented. The following sections present the updated unconditional and conditional contributions.

Unconditional Contribution

In the unconditional scenario, GHG emissions would be reduced by **27.56 Mt CO_2e (6.73%) below BAU in 2030** in the respective sectors. 26.3 Mt CO_2e (95.4%) of this emission reduction will be from the Energy sector while 0.64 (2.3%) and 0.6 (2.2%) Mt CO_2e reduction will be from AFOLU (agriculture) and waste sector respectively. There will be no reduction in the IPPU sector.

Conditional Contribution

In the conditional scenario, GHG emissions would be reduced by **61.9 Mt CO_2e (15.12%) below BAU in 2030** in the respective sectors. This reduction is in addition to the proposed reductions in 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 CO_2e (96.46%) emission reduction from the Energy sector, while 0.4 (0.65%) and 1.84 (2.97%) Mt CO_2e reduction will be from AFOLU (agriculture) and Waste Sector respectively. There will be no reduction in the IPPU Sector. Table 3 presents the GHG reduction under unconditional and conditional scenarios.

Table 3: GHG emission reduction scenario

UNFCCC Sector	Sub-sector	GHG Emission Scenario		GHG Reduction by Mitigation (2030)							
		BAU 2030		Unconditional			Conditional			Combined	
		$MtCO_2e$	In %	$MtCO_2e$	Reduction $MtCO_2e$	In %	$MtCO_2e$	Reduction $MtCO_2e$	In %	Reduction $MtCO_2e$	In %
Energy	Power	95.14	23.24	87.13	8.01	29.06	51.4	35.73	57.72	43.74	48.9
	Transport	36.28	8.86	32.89	3.39	12.30	26.56	6.33	10.23	9.72	10.86
	Industry (energy)	101.99	24.91	95.33	6.66	24.17	94.31	1.02	1.65	7.68	8.58
	Other energy sub sectors:										
	Households	30.41	7.43	28.78	1.63	5.91	24.77	4.01	6.46	5.64	6.3
	Commercial	3.35	0.82	2.94	0.41	1.49	2.51	0.43	0.69	0.84	0.94
	Agriculture	10.16	2.48	9.37	0.79	2.87	10.13	0.03	0.05	0.82	0.92
	Brick Kilns	23.98	5.86	20.7	3.28	11.90	12.82	7.88	12.73	11.16	12.47
	Fugitive	8.31	2.03	8.31			4.03	4.28	6.91	4.28	4.78
	F Gases	2.92	0.71	0.78	2.14	7.76	0.03	0.75	1.21	2.89	3.23
Total Energy		312.54	76.34	286.23	26.31	95.46	226.56	59.71	96.46	85.98	96.1
IPPU	Cement and Fertilizer	10.97	2.68	10.97			10.97				
AFOLU	Agriculture and Livestock	54.64	13.35	54	0.64	2.32	53.6	0.4	0.65	1.04	1.16
	Forestry	0.37	0.09	0.37			0.37				
Total AFOLU		55.01	13.44	54.37	0.64	2.32	53.97	0.4	0.65	1.68	1.16
Waste	MSW and wastewater	30.89	7.55	30.28	0.61	2.21	28.44	1.84	2.97	2.45	2.74
Total Emission		**409.41**		**381.85**			**319.94**				
Total Reduction					**27.56**	**6.73**		**61.9**	**15.12**	**89.47**	**21.85**
Note: INDC (2015) proposed 12 $MtCO_2e$ *(5%) reduction in unconditional and a further 24* $MtCO_2e$ *(10%) reduction in conditional scenario*											
Note: NDC (2020) proposed 27.56 $MtCO_2e$ *(6.73%) reduction in unconditional and an additional 61.91* $MtCO_2e$ *(15.12%) reduction in conditional scenario.*											

This contribution is based on the analysis carried out in 2020-21 using the best available data. However data quality and availability is an issue in Bangladesh. If new and more robust data comes to light in the future, or if assumptions change (e.g. projections of population or economic growth) the government will update its analysis accordingly. This will be coordinated with the National Communication and Biennial Update Report reporting cycle.

Potential Actions

Unconditional Contribution

The targeted GHG emission reduction for unconditional contributions will be implemented through a set of mitigation actions. The potential mitigations actions are elaborated in Table 4.

Table 4: Possible Mitigation Actions to deliver the Unconditional Contribution

Sector	Description	Actions by 2030
Energy	**Power** • Implementation of renewable energy projects • Enhanced efficiency of existing power plants • Use of improved technology for power generation	**Power** • Implementation of renewable energy projects of 911.8 MW ◦ Grid-connected Solar-581 MW, Wind-149 MW, Biomass-20 MW, Biogas-5 MW, New Hydro-100 MW, Solar Mini-grid-56.8 MW • Installation of new Combined Cycle Gas based power plant (3208 MW) • Efficiency improvement of Existing Gas Turbine power plant (570 MW) • Installation of prepaid meter

	Transport
	• Improvement of fuel efficiency for transport sub-sector
	• Increase use of less emission-based transport system and improve Inland Water Transport System
		Transport
		• Improvement of road traffic congestion (5% improvement in fuel efficiency)
		  ◦ Widening of roads (2 to 4 lanes) and improving road quality
		  ◦ Construct NMT and bicycle lanes
		  ◦ Electronic Road Pricing (ERP) or congestion charging
		  ◦ 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
		  ◦ 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.
		  ◦ Purchase of modern rolling stock and signaling system for railway
		  ◦ Electrification of the railway system and double-

Sector	Description	Actions by 2030
		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 • Increase energy efficiency in the Industry sub-sector **Agriculture** • Enhanced use of solar energy in Agriculture **Brick Kilns** • Enforcement and Improved technology use **Residential and Commercial** • Enhanced use of energy-efficient appliances in household and commercial buildings **F-Gases** Implement Montreal Protocol targets	**Industry** • Achieve 10% Energy efficiency in the Industry sub-sector through measures according to the Energy Efficiency and Conservation Master Plan (EECMP) **Agriculture** • Implementation of 5925 Nos. solar irrigation pumps (generating 176.38MW) for agriculture **Brick Kilns** • 14% 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) **F-Gases** • Reduction of Ozone Depleting Gases (HCFCs) use in air conditioning as per Montreal protocol targets by 2025
AFOLU	**Agriculture** • Reduction of emission from Rice Field, Fertiliser User, Enteric Fermentation and Manure Management	**Agriculture** *Methane emission reduction from Rice field* • Upscaling Alternate Wetting and Drying (AWD) in dry season rice field in 50,000 ha of crop lands • Rice Varietal Improvement for 1,111,000 ha crop lands *Nitrous Oxide emission reduction from nitrogen-based Fertilizer* • 209,000 ha crop land Management (leaf color 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 • Bringing more area under pulse cultivation

Sector	Description	Actions by 2030
	Forestry • Deforestation reduction • Reforestation/ Afforestation • Forest restoration • Increase tree cover	*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) • Feed improvement by using a balanced diet and beneficial micro-organisms for livestock (Large Ruminant – 0.51 million and Small Ruminant – 0.68 million) *Methane and Nitrous Oxide emission from Manure management* • Improved manure management through promotion of mini biogas plants (57,000 nos.) • Awareness and training programme **Forestry** • Increase forest cover. • Increase tree cover from 22.37% (2014) to 24%. • Afforestation and reforestation in the coastal areas, islands and degraded areas – 150,000 ha. • Restore the deforested forests – 137,800 ha at the hill and plain land sal forest. • Restore the degraded forests – 200,000 ha at the hill and plain land sal forest. • Plantation in roadsides, embankments, private lands etc.
Waste	• Improved Municipal solid waste management • Ensure 3R principle for waste management	• Establishment of Waste to Energy plant in Dhaka • Establishment of Incineration plant in one City • Regional Integrated Landfill and Resource Recovery Facility in One City

Conditional Contribution

The mitigation actions for conditional contributions will be in a more extensive way along with the unconditional contribution. A set of potential mitigation actions for conditional contributions are described in Table 5.

Table 5: Possible Mitigation Actions to deliver the Conditional Contribution

Sector	Description	Actions by 2030
Energy	**Power** • Implementation of renewable	**Power** • Implementation of renewable energy projects of 4114.3

Sector	Description	Actions by 2030
	energy projects • Enhanced efficiency of existing power plants • Use of improved technology for Power generation **Transport** • Improvement of fuel efficiency for transport sub-sector • Increase use of less emission-based transport system and improve Inland Water Transport System	MW • Grid-connected Solar-2277 MW, Wind-597 MW, Biomass-50 MW, Biogas-5 MW, New Hydro-1000 MW, Solar Mini-grid-56.8 MW, Waste to Electricity-128.5 MW • Coal power plant with Ultra super critical technology-12147 MW • Installation of new Combined Cycle Gas based power plant (5613 MW) • 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 (15% improvement in fuel efficiency) • Widening of roads (2 to 4 lanes) and improving road quality • Construct NMT and bicycle lanes • Electronic Road Pricing (ERP) or congestion charging • 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 • Introducing Intelligent Transport System (ITS) based public transport management system to ensure better performance, enhance reliability, safety and service • Establish charging station network and electric buses in major cities • 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. • Purchase of modern rolling stock and signaling

Sector	Description	Actions by 2030
		system for railway • 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 • Increase energy efficiency in Industry sub-sector	**Industry** • 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 • Enhanced use of solar energy in Agriculture	**Agriculture** • Implementation of 4102 Nos. solar irrigation pumps (generating 164 MW) for agriculture
	Brick Kilns • Enforcement and Improved technology use	**Brick Kilns** • 47% emission reduction through Banning Fixed Chimney kiln (FCK), encourage advanced technology and non-fired brick use
	Residential and Commercial • Enhanced use of energy-efficient appliances in household and commercial buildings	**Residential and Commercial** • Use energy-efficient appliances in household and commercial buildings (achieve 19% and 25% reduction in emission respectively)
	F-Gases • Further reduction of Ozone Depleting Gases	**F-Gases** • Reduction of Ozone Depleting Gases (HCFCs) use in air conditioning after 2025.
	Fugitive Emission • Gas leakage reduction	**Fugitive Emission** • 51% emission reduction from Gas leakage through CDM projects
AFOLU	**Agriculture** • Reduction of emission from Rice Field, Fertiliser User, Enteric Fermentation and Manure Management	**Agriculture** *Methane emission reduction from Rice field* • Upscaling Alternate Wetting and Drying (AWD) in dry season rice field in 100,000 ha of crop lands

Sector	Description	Actions by 2030
		• Rice Varietal Improvement for 2,129,000 ha crop lands *Nitrous Oxide emission reduction from nitrogen-based Fertilizer* • 627,000 ha crop land Management (leaf color 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 150,000 ha • Bringing more area under pulse cultivation *Methane emission from Enteric Fermentation* • 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 1.013 million and Small Ruminant – 1.355 million) *Methane and Nitrous Oxide emission from Manure management* • Improved manure management through promotion of mini biogas plants (107,000 nos.) • Expansion of awareness and training programme
	Forestry • Deforestation reduction • Reforestation/ Afforestation • Forest restoration • Maintain forest and tree cover	**Forestry** • Maintain the forest cover and tree cover through collaborative forest management, social forestry and other programs. • Forest conservation by Scale-up of alternative income-generating activity for forest-dependent communities- 55,000 nos. families • Co-management in Protected areas -72,000 ha • Additional coastal afforestation activities. • Maintain the restoration of degraded or deforested areas. • Plantation in roadsides, embankments, private lands etc.
Waste	• Improved Municipal solid waste management • Ensure 3R principle for waste management • Improvement of Sewerage treatment	• Establishment of Incineration plant in 3 Cities • Implementation of wastewater treatment plants in several cities • Expansion of Regional Integrated Landfill and Resource Recovery Facility in other cities

Along with these measures, a set of initiatives will be undertaken for IPPU Sector. However, no GHG emission reduction is committed for this Sector. The potential mitigation measures in IPPU sector includes switching to more efficient industrial processes in fertilizer and cement manufacturing. The cement factories can switch to technologies like vertical roller mills, resulting in energy savings. In fertilizer manufacturing, one Industry has been established with the modern and efficient process, and a few more are in the pipeline.

Achievements and Initiatives

Mujib Climate Prosperity Plan up to 2030

Bangladesh has assumed the presidency of the 48-nation Climate Vulnerable Forum (CVF) and the Vulnerable Twenty (V20) Group of Finance Ministers. Honorable Prime Minister of Bangladesh H.E. Sheikh Hasina is serving as Chair of the CVF since June 2020. As Chair of the CVF, Honorable Prime Minister has launched a program to develop "Mujib Climate Prosperity Plan" for Bangladesh. The Plan will be the first of CVF plans, with a strategic investment framework to mobilize financing, especially through international cooperation, for implementing renewable energy and climate resilience initiatives. The Draft plan identifies several key initiatives, which focus in renewable energy, energy storage infrastructure, power grid modernization, Established carbon market regime, Bangladesh Delta Plan 2100 resilience bonds, training and skills development for future, Future-proof Bangladesh's industries, locally-led adaptation outcomes, Micro, Small and Medium Enterprise financial protection and productivity enhancement, Climate-Resilient and Nature-Based agricultural and fisheries development, environment friendly transport, climate resilient well-being programs and Accelerated digital revolution.

Ashrayan: Shelter for the Homeless and Landless

The government is implementing the shelter project for landless and homeless people. Under the project, 442,608 families have been rehabilitated in 22640 barracks and 0.26 million houses. Additionally, 4,409 climate refugee families are being rehabilitated in Khuruskul, Cox's Bazar. Besides enhancing disaster resilience, the project also focuses on mitigation through implementing 1.58 million tree plantations, rainwater harvesting, Solar Home System based alternate power sources, improved cook stoves etc. Besides this, 50,104 families have been rehabilitated by the Cluster village project, where 0.455 million trees have been planted.

National Solar Energy Roadmap, 2021-2041

The National Solar Energy Roadmap, 2021 - 2041 has been drafted to frame a long-term vision for the nation and set possible capacity targets for the country's solar energy initiative. This outline the broader strategies required to achieve those targets. Based on three implementation scenarios, the Roadmap delineates a few general as well as specific and time-bound measures to achieve that target by the year 2041.

National Action Plan for Clean Cooking, 2020-2030

Bangladesh's Country Action Plan for Clean Cook Stoves 2013 (CAP 2013) focused predominantly on the removal of existing financing barriers by enabling access to capital by SMEs, promoting access to climate funds, leveraging government funds to finance women-led businesses in the sector and lobbying for additional financing options from international donors at low rates. About 4.5 million improved cook stoves have been distributed already. A new National Action Plan for Clean Cooking in Bangladesh (2020-2030) is being formulated following its success.

Forest and Carbon Inventories and Tree Plantation

Bangladesh Forest Department (BFD) conducted National Forest Inventory (NFI) during 2016-2019 to identify the status of forest and tree resources, carbon and biomass stock, dependency of local people on trees and forests and the ecology. The government has developed the Forest Reference Level (FRL) and Forest Reference Emission Level (FREL) and submitted them to the UNFCCC. To reduce the carbon emission from the forestry sector, Bangladesh formulated Bangladesh National REDD+ Strategy (BNRS). It established a National Forest Monitoring System (NFMS) for periodical monitoring of tree and forest cover. To celebrate the birth centenary of the Father of the Nation Bangabandhu Sheikh Mujibur Rahman, BFD has planted 10 million tree saplings around Bangladesh. The Ministry of Disaster Management and Relief has planted 5.4 million Palm trees which will contribute to carbon sink and reduce the risk of death due to lightning.

Bangladesh National Action Plan for Reducing Short-Lived Climate Pollutants

The NAP-SLCPs were formulated with support from the Climate and Clean Air Coalition in February 2012 to reduce SLCPs. The plan focuses on identifying and implementing the most cost-effective measures for large-scale implementation of SLCP mitigation. Eleven priority mitigation measures were included in the SLCP Plan, six of which target primary black carbon sources, while the rest five target major methane sources. The plan's full implementation is expected to reduce black carbon emissions by 40% and methane emission by 17% in 2030 compared to a business as usual (BAU) scenario.

Energy Efficiency and Conservation Master Plan up to 2030

Under this comprehensive plan, the government aims to lower energy intensity (national primary energy consumption per unit of GDP) in 2030 by 20% compared to the 2013 level. A total of 95 million toe (113 billion m^3 of gas equivalent) is expected to be saved during the period.

Renewable Energy Initiatives

Bangladesh has taken up a number of initiatives to enhance the best utilization of renewable energy. Bangladesh has installed more than 6 million solar-home systems (SHSs) across the country

benefiting more than 18 million (11%) population. Around 66 MW is being produced through roof top solar panels installed in government and private buildings. 2226 solar irrigation systems have been installed around the country. The government has extended a re-financing scheme to finance alternative energy generation projects like small scale solar and micro grids, to improve energy access in off- grid areas.

Promoting Green Technology

Bangladesh Bank established a refinance scheme to support environment-friendly technology such as solar energy, bio-gas plants, and Effluent Treatment Plants (ETP). The initial projcts focused on only 10 products, which has increased to 50 products under 11 categories: renewable energy, energy efficiency, solid waste management, liquid waste management, alternative energy, fire burnt brick, non-fire block brick, recycling and recyclable product, ensuring safety in work environment of factories, etc. 39 banks and 19 financial institutions have signed a participation agreement with Bangladesh Bank to avail finance from this scheme.

Bangladesh Climate Change Trust Fund

The Bangladesh Climate Change Trust Fund (BCCTF) has undertaken 800 projects with an investment of 449.3 million USD to implement strategic actions of the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), which mainly focus on adaptation, mitigation and climate change research.

Bangladesh Delta Plan 2100

The government has recently adopted the Bangladesh Delta Plan 2100, a comprehensive 100-year strategic plan aimed at gradual sustainable development through adaptive delta management process. The Delta plan has included climate change as a significant future challenge. It reaffirms Bangladesh's commitment to reducing GHG emissions from key sectors through efforts like promoting improved rice parboiling systems and ensure energy efficiency, research on the suitability of various tree species for their carbon-locking properties suitable for forestry programs. The plan targets to achieve a safe, climate-resilient and prosperous delta with a mission to ensure long term water and food security, economic growth and environmental sustainability, effectively reducing vulnerability to natural disasters and building resilience to climate change. Total 80 projects are planned to be implemented with $37 billion investment, while 34 projects are identified as climate-sensitive.

National Adaptation Plan

Bangladesh is currently preparing the National Adaptation Plan (NAP) to address climate change. This will include an overview on climate change hazard, risk and vulnerability for Bangladesh. Current adaptation strategies for different impacts due to climate change undertaken in different projects/initiatives from both the government and NGO/CSOs will be identified and Success stories/case studies on resilient adaptation options will be included in the NAP. The plan will include future recommendations on mentioned issues focusing on regional and local level solutions along with strategies at national level. A set of recommendations for institutions and implementation mechanism for NAP will be included.

Adaptation Action

As stated earlier, mitigation and adaptation often coexist, and quite a few adaptation actions have mitigation co-benefits. Bangladesh's NDC, therefore, has an adaptation component that describes what Bangladesh has already done on adaptation and what are the priorities for the future long-term vision for adaptation keeping synergies with mitigation actions. Since the development of comprehensive National Adaptation Plan (NAP) is currently underway, Bangladesh wishes to communicate adaptation communication drawing the inputs from NAP process next year. The two vital national plans to address climate change in Bangladesh are the National Adaptation Programme of Action (NAPA), developed in 2005 and subsequently revised in 2009, and the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), released in 2009. BCCSAP comprised 44 Programmes under six thematic areas to deal with adverse impacts of climate change as well as supporting low carbon economic growth. The priority pillars for implementing strategies were: (1) Food security, social protection and health; (2) Comprehensive disaster management; (3) Infrastructure development; (4) Research and knowledge management; (5) Mitigation and low carbon development; and (6) Capacity building and institutional development. BCCSAP is in the final stages of being updated to make it more appropriate in keeping with advancements in science, technology and knowledge since its first formulation.

Climate Change Trust Fund Act 2010 (CCTFA) was introduced in response to the need for a specific law for handling Climate Change Trust Fund (CCTF) of the Government of Bangladesh with transparency so that the benefits accruing from CCTF-financed projects reach the intended beneficiaries.

As a first CVF plan, the draft “Mujib Climate Prosperity Plan”, aims at mobilizing financing, primarily through international cooperation, for implementing climate resilience initiatives such as an expansion of locally-led adaptation, the establishment of carbon market regime, Bangladesh Delta Plan 2100 resilience bonds, climate-resilient and nature-based agricultural and fisheries

development, climate resilient well-being programs and accelerated digital revolution, training and skills development.

The NAP formulation will identify the co-benefits so that the synergy between adaptation and mitigation can be fully achieved. As all such activities need to be financed and proper incentives need to be provided, the government has formulated and operationalized a Climate Fiscal Framework (CFF), providing principles and tools for climate fiscal policy-making (CFP).

8th FYP, Bangladesh Country Investment Plan for Environment, Forestry and Climate Change (2016-2020) (EFCC CIP), Perspective Plan for 2021-2041 (PP2041) emphasizes the importance of managing climate change and indicates the priorities for implementing the BCCSAP. Other sectoral plans and strategies also focus on adaptation action to climate change.

The Forest Investment Plan (FIP, 2017-2022) has been developed to identify future investment opportunities to increase the forest cover, reduce deforestation and forest degradation and improve the livelihoods of the forest-dependent people through the implementation of participatory/social forestry.

The Government of Bangladesh has demonstrated its commitment to undertake both adaptation and mitigation efforts as part of its plan for sustainable development. Every year the Government channels resources for significant investment in projects/programs for ensuring climate resilience. It currently spends US$1 billion a year, around 6 to 7 per cent of its annual budget, on climate change adaptation (CCA). However, the World Bank estimates that the country would need US$5.7 billion as adaptation finance by 2050, which is more than 5 times higher than the current expenditure for CCA.[1] Three-quarters of money spent on climate change in the country comes directly from the government, while the rest comes from international development partners including bilateral, multi-lateral and private funding. Some significant achievements towards climate change adaptation at the national level are briefly described below:

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.

[1] MoF (2020). Climate Finance for Sustainable Development. Finance Division, Ministry of Finance, Government of the People's Republic of Bangladesh. Available at: 2020-2021_Climate_BR_English.pdf (portal.gov.bd)

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 polders 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 (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 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 marsh lands 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 reducing ground water 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 litre 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 Mechanism

Monitoring, Transparency and Institutional Aspects for NDC Implementation

Adhering to the spirit for global action, and given the various necessary policies and measures undertaken over the last few years and some of them already bearing fruits, the government is enhancing both unconditional and conditional contribution in the updated NDC. These contributions have been prepared considering the national principles of maintaining a minimum 8% rate of economic growth, complete eradication of poverty by 2030, and food and nutrition security for all citizens.

Bangladesh has prepared an NDC implementation roadmap and action plan which suggests Governance arrangements for the NDC-NAP implementation framework. Bangladesh is working to put a workable Measurement, Reporting, and Verification (MRV) system to maintain transparency and verification of its mitigation efforts and outcomes. The NDC update is based on already planned projects of the government. The unconditional contribution has included confirmed mitigation actions from related ministries and the conditional contribution has included proposed/ planned mitigation actions from related ministries which would require international support.

Capacity Building and Strengthening

Bangladesh will need adequate finance, technology, and capacity-building support to implement the NDCs effectually. Capacity building has been identified as a mode of NDC enhancement. Some major areas for capacity building and awareness development include:

- Enhancing the capacity of MoEFCC and DoE for effective implementation of NDC.
- Consultation with key departments and ministries should be undertaken to understand the challenges they face during NDC implementation.

- Capacities need to be built on regular data collection, archiving and data management for GHG inventory, specialized technical capability, and assumptions to develop of various emissions drivers.
- Capacity building on MRV process and its implementation for different sectors.

Technology Development and Transfer

Bangladesh will require international support in Technology transfer related to GHG emission reduction for different sectors. The achievement of conditional contribution will heavily depend on new and more efficient technologies.

Implementation Challenges and Barriers

Some of the key implementation challenges identified during 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 on a regular basis for industries, transport, agriculture, forestry and waste. Studies need to be conducted on a periodic basis 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 field. 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.

Climate Financing

The implementation of the proposed mitigation and adaptation actions to address climate change requires substantial financial resources. The Government of Bangladesh will continue to commit resources to climate change relevant strategies. The private sector and NGOs can also contribute significantly to these climate change-related activities through public-private partnerships. Banks and Financial Institutions in Bangladesh will continue to play a vital role in financing low-carbon

climate-resilient projects and programmes through their separate Green Banking window. However, the full implementation of the strategic mitigation actions is conditional on the support of international stakeholders. The implementation of the prioritized policies and measures assume the continued use of existing and planned national and international financial sources through the use of climate finance and international market mechanisms where appropriate. To have an idea of the financial needs to implement the measures, tentative cost estimation was carried out. These estimates were drawn from existing information from stakeholders and might need to be updated based on further detailed analysis.

Energy Sector

The cost estimate for the implementation of Key mitigations measures in the energy sector under the unconditional and conditional scenario is outlined in table 6.

Table 6: Estimated cost of key mitigation measures in Energy

Mitigation Measure	**Estimated investment required (million USD, 2021-2030)**	
	Unconditional	**Conditional**
Implementation of energy efficient coal power plant	9905	13204
Implementation of renewable energy projects		
Grid connected Solar	1208	1845
Wind	333	600
Biomass	35.4	71
Biogas	32.1	64
Hydro	204	2166
solar mini grid	260.5	260.5
Implement re-powering of old power plant	561.5	561.5
Installation of prepaid electricity meter	870	1305
Implementation of EECMP targets	1500	1500
Transport Plan Preparation, policy initiatives and ITS	70	500
Implementation of MRT and BRT	4200	12470
Multi modal Hub development	800	200
Widening of roads, improving road quality and Construct NMT and bicycle lanes	1500	700
Construction of Expressways		1000
Establish charging station network and electric buses in major cities		60000
Purchase of modern rolling stock and signaling system for railway	5000	5000
Electrification of railway system and double track construction		20000
Improved and enhanced Inland Water Transport	3000	10000
Implementation of solar irrigation pumps	0.4	420.8
Installation of prepaid gas meter	1397	5588.5
Phasing out HCFCs		2

AFOLU Sector

The cost estimate for the implementation of Key mitigations measures in the AFOLU sector under the unconditional and conditional scenario is outlined in table 7.

Table 7: Estimated cost of key mitigation measures in AFOLU

Mitigation Measure	**Estimated investment required (million USD, 2021-2030)**	
	Unconditional	**Conditional**
Implement AWD in dry season rice field	17.65	35.29
Varietal improvement	79.65	153.82
Land management	1.23	3.69
Fertilizer Management (deep placement in rice field)	2.40	7.20
Bring More Area under pulse cultivation	5.29	0.00
Replacement of low-productive animals with high-producing crossbred cattle	8.15	16.29
Feed improvement (Use of balanced diet and beneficial microorganism)	138.70	275.68
Improve manure management (promotion of mini biogas plants, maintenance, training and awareness)	16.47	14.71
Forestry related Activities	500	2000

Waste Sector

In the Waste Sector, the cost estimate for the implementation of Key mitigations measures in the energy sector under the unconditional and conditional scenario is outlined in table 8.

Table 8: Estimated cost of key mitigation measures in Waste

Mitigation Measure	**Estimated investment required (million USD, 2021-2030)**	
	Unconditional	**Conditional**
Incineration plants	608	1791
Municipal Solid Waste Management Facility		6
Implementation of wastewater treatment plants		1958
Regional Integrated Landfill and Resource Recovery Facility	2.7	8.5

Information to facilitate clarity, transparency and understanding of Bangladesh's NDC

1. Quantifiable information on the reference point (including, as appropriate, a base year)	
(a) Reference year(s), base year(s), reference period(s) or other starting point(s):	The Base year for Bangladesh's updated NDC is 2012.
(b) Quantifiable information on the reference indicators, their values in the reference year(s), base year(s), reference period(s) or other starting point(s), and, as applicable, in the target year:	Total GHG emission accounts for 169.05 $MtCO_2e$ for the Base Year 2012. The contributions of the sectors are; Energy: 93.09 $MtCO_2e$ IPPU: 5.61 $MtCO_2e$ AFOLU: 46.24 $MtCO_2e$ Waste: 24.11 $MtCO_2e$ Total GHG emission will be 409.4 $MtCO_2e$ in 2030 under BAU scenario. The contributions of the sectors are; Energy: 312.54 $MtCO_2e$ IPPU: 10.97 $MtCO_2e$ AFOLU: 55.01 $MtCO_2e$ Waste: 30.89 $MtCO_2e$
(c) For strategies, plans and actions referred to in Article 4, paragraph 6, of the Paris Agreement, or polices and measures as components of nationally determined contributions where paragraph 1(b) above is not applicable, Parties to provide other relevant information:	Not applicable.
(d) Target relative to the reference indicator, expressed numerically, for example in percentage or amount of reduction:	In unconditional scenario, GHG emissions would be reduced by 27.56 Mt CO_2e (6.73%) below BAU in 2030 and in conditional scenario, GHG emissions would be reduced by 89.47 Mt CO_2e (21.85%) below BAU in 2030 in the respective sectors.
(e) Information on sources of data used in quantifying the reference point(s):	The Base Year information is mainly from the GHG inventory prepared in Third National Communications. Additionally, the base year emission has been updated with additional details for Fugitive emission from leakages in gas distribution network, F-gases, gas and electricity use in households, which were not included in the TNC.
(f) Information on the circumstances under which the Party may update the	Information on emissions and reference values may be updated and recalculated due to methodological improvements applicable to the inventories in their next

values of the reference indicators:	iteration for Biennial Update Report or National Communication.
2. Time frames and/or periods for implementation:	
(a) Time frame and/or period for implementation, including start and end date, consistent with any further relevant decision adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA):	From 1 January 2021- 31 December 2030.
(b) Whether it is a single-year or multi-year target, as applicable:	Single-year targets for 2030. The target might be updated in 2025.
3. Scope and coverage:	
(a) General description of the target:	Economy-wide absolute targets for 2030 in the respective sectors mentioned in 1(b).
(b) Sectors, gases, categories and pools covered by the nationally determined contribution, including, as applicable, consistent with Intergovernmental Panel on Climate Change (IPCC) guidelines:	The sectors are covered economy-wide while no quantified contribution is included for Forestry and IPPU. The gases included are CO_2, CH_4, N_2O, and hydro fluorocarbons (HFCs). IPCC 2006 guidelines were followed for the GHG inventory.
(c) How the Party has taken into consideration paragraph 31(c) and (d) of decision 1/CP.21:	Bangladesh has expanded the coverage of NDC by including more sectors than in INDC.
(d) Mitigation co-benefits resulting from Parties' adaptation actions and/or economic diversification plans, including description of specific projects, measures and initiatives of Parties' adaptation actions and/or economic diversification plans:	Not applicable.
4. Planning processes:	
(a) Information on the planning processes that the Party undertook to prepare its nationally determined contribution and, if available, on the Party's implementation plans, including, as appropriate:	
(i) Domestic institutional arrangements, public participation and engagement with local communities and indigenous peoples, in a gender-responsive manner:	The updated NDC is prepared following a structured process involving stakeholders from relevant ministries and agencies. The required data has been collected through IPCC suggested structured template from the agencies on present condition and future plans and projects relevant to GHG emission reduction. Following this, the initial scenario analysis was carried out in LEAP

	program and outcomes have been validated with the relevant ministries and agencies in a validation workshop. The possible mitigation measures have been finalized based on the discussion in the validation process. Besides, the stakeholder consultations included participants from academia, the private sector and reporters.
(ii) Contextual matters, including, inter alia, as appropriate:	
a. National circumstances, such as geography, climate, economy, sustainable development and poverty eradication:	Bangladesh is a low-lying delta with a flat topography that makes it particularly susceptible to extreme weather events. The country is relatively small with an area of 147,570 sq. km and located in South Asia. The current population of Bangladesh is 169.81 million in 2020. Among the different zones of the country, the climate change hotspots are in the central and western coastal area, the north-western highlands, and along the main rivers where both biophysical and socio-economic vulnerability are high. Bangladesh is one of the most vulnerable countries due to climate change as it faces multiple climate impacts like flood, drought, extreme temperature and rainfall, salinity and sea-level rise. Bangladesh has made substantial progress in the recent past through rapid economic development and poverty reduction measures. The country is also making progress in sustainable development and poverty eradication.
b. Best practices and experience related to the preparation of the nationally determined contribution:	The current NDC update is the result of experience gained and lessons learned from the Intended Nationally Determined Contribution (INDC) submitted to the UNFCCC in 2015, preparation of NDC implementation roadmap and action plan in 2018 and National Communications to UNFCCC.
c. Other contextual aspirations and priorities acknowledged when joining the Paris Agreement:	Bangladesh has always been an active participant in international climate change negotiations. The country demonstrated the same level of engagement in the negotiations, signing, and ratification of the Paris Agreement. Bangladesh is currently leading the Climate Vulnerable Forum for the second time. To implement the conditional contributions, Bangladesh will require financial, technology transfer and capacity building related support from the international community.
(b) Specific information applicable to Parties, including regional economic integration organizations and their member States, that have reached an agreement to act jointly under Article 4, paragraph 2, of the Paris Agreement,	Not applicable

including the Parties that agreed to act jointly and the terms of the agreement, in accordance with Article 4, paragraphs 16–18, of the Paris Agreement:	
(c) How the Party's preparation of its nationally determined contribution has been informed by the outcomes of the global stock take, in accordance with Article 4, paragraph 9, of the Paris Agreement:	Bangladesh has updated its NDC to include additional sectors and enhanced its mitigation ambition from the first iteration. This will positively contribute to the global stock take in 2023.
(d) Each Party with a nationally determined contribution under Article 4 of the Paris Agreement that consists of adaptation action and/or economic diversification plans resulting in mitigation co-benefits consistent with Article 4, paragraph 7, of the Paris Agreement to submit information on:	
(i) How the economic and social consequences of response measures have been considered in developing the nationally determined contribution:	Not applicable
(ii) Specific projects, measures and activities to be implemented to contribute to mitigation co-benefits, including information on adaptation plans that also yield mitigation co-benefits, which may cover, but are not limited to, key sectors, such as energy, resources, water resources, coastal resources, human settlements and urban planning, agriculture and forestry; and economic diversification actions, which may cover, but are not limited to, sectors such as manufacturing and industry, energy and mining, transport and communication, construction, tourism, real estate, agriculture and fisheries:	Not applicable
5. Assumptions and methodological approaches, including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals:	
(a) Assumptions and methodological approaches used for accounting for anthropogenic greenhouse gas emissions	Bangladesh had prepared its national inventories based on the 2006 IPCC Guidelines and other IPCC guidelines. Most of the analysis followed Tier 1 methodology, while

and removals corresponding to the Party's nationally determined contribution, consistent with decision 1/CP.21, paragraph 31, and accounting guidance adopted by the CMA:	Bangladesh has prepared its Forest Reference Level using Tier 2 methodology.
(b) Assumptions and methodological approaches used for accounting for the implementation of policies and measures or strategies in the nationally determined contribution:	In addition to 5(a) above, Bangladesh will also apply specific assumptions and methodologies, when appropriate, when assessing progress made under the policies and measures related to the implementation of its NDC in its National Communications and Biennial Update Reports.
(c) If applicable, information on how the Party will take into account existing methods and guidance under the Convention to account for anthropogenic emissions and removals, in accordance with Article 4, paragraph 14, of the Paris Agreement, as appropriate:	See 5 (a) above.
(d) IPCC methodologies and metrics used for estimating anthropogenic greenhouse gas emissions and removals:	See 5 (a) above.
(e) Sector-, category- or activity-specific assumptions, methodologies and approaches consistent with IPCC guidance, as appropriate, including, as applicable:	
(i) Approach to addressing emissions and subsequent removals from natural disturbances on managed lands:	Not Applicable.
(ii) Approach used to account for emissions and removals from harvested wood products:	Not Applicable.
(iii) Approach used to address the effects of age-class structure in forests:	Not Applicable.
(f) Other assumptions and methodological approaches used for understanding the nationally determined contribution and, if applicable, estimating corresponding emissions and removals, including:	
(i) How the reference indicators, baseline(s) and/or reference level(s), including, where applicable, sector-, category- or activity-specific reference levels, are constructed, including, for example, key parameters, assumptions, definitions, methodologies, data sources	Bangladesh hasn't used any other assumptions or methodological approaches. Details of the assumption and data sources are described in Base Year and Future Emission Scenario section.

and models used:	
(ii) For Parties with nationally determined contributions that contain non greenhouse gas components, information on assumptions and methodological approaches used in relation to those components, as applicable:	Not applicable.
(iii) For climate forcers included in nationally determined contributions not covered by IPCC guidelines, information on how the climate forcers are estimated:	Not applicable.
(iv) Further technical information, as necessary:	Not applicable.
(g) The intention to use voluntary cooperation under Article 6 of the Paris Agreement, if applicable:	Yes, when appropriate. Bangladesh has participated in the Clean Development Mechanism of the Kyoto Protocol and continues to believe in the important role of innovative financing mechanism for climate actions with sustainable development benefits. The cooperative approaches in market and non-market mechanisms under Article 6 of the Paris Agreement are an important instrument to raise mitigation ambition while promoting sustainable development.
6. How the Party considers that its nationally determined contribution is fair and ambitious in the light of its national circumstances:	
(a) How the Party considers that its nationally determined contribution is fair and ambitious in the light of its national circumstances:	Bangladesh contributes less than 0.35% of global emissions. However, Bangladesh recognizes that in order to meet the 2 degrees objective all countries will need to undertake drastic mitigation measures. Bangladesh's approach is driven by the long-term goal announced by its Prime Minister that its per capita GHG emissions will not exceed the average for developing countries. Therefore, Bangladesh's approach focuses on putting itself on a pathway which will avoid an increase of emissions per capita beyond this level, while pursuing national development goals. Bangladesh is still putting forward actions that will allow the country to embark on a low carbon development pathway, keeping in mind the global climate change agenda. This NDC update represents an enhanced ambition for mitigation with a substantial increase from the INDC. The actions needed to deliver on these commitments will

	require international support in the form of finance, technology transfer and capacity building. Bangladesh will also provide a relevant contribution regarding national financial resources, staff time and robust integration of development and mitigation activities. In selecting the actions set out above, Bangladesh has prioritized those which fit with the growth priorities set out in our national development plans. In addition, Bangladesh has captured the synergies between mitigation and adaptation. The INDC suggested measures have already been taken forward by the country's own resources, thus demonstrating that Bangladesh is not content to wait for international support to take action on climate change.
(b) Fairness considerations, including reflecting on equity:	See 6 (a) above.
(c) How the Party has addressed Article 4, paragraph 3, of the Paris Agreement:	The updated unconditional and conditional contributions of Bangladesh have increased emission reduction targets substantially. The unconditional target has been increased from 12 $MtCO_2e$ to 27.56 $MtCO_2e$ below BAU in 2030. The conditional target has been increased from 36 $MtCO_2e$ to 89.47 $MtCO_2e$ below BAU in 2030.
(d) How the Party has addressed Article 4, paragraph 4, of the Paris Agreement:	Despite being a least developing country, Bangladesh has already adopted an absolute, economy-wide target in this NDC update.
(e) How the Party has addressed Article 4, paragraph 6, of the Paris Agreement:	Not applicable.
7. How the nationally determined contribution contributes towards achieving the objective of the Convention as set out in its Article 2:	
(a) How the nationally determined contribution contributes towards achieving the objective of the Convention as set out in its Article 2:	See 6(a) and 6(c) above.
(b) How the nationally determined contribution contributes towards Article 2, paragraph 1(a), and Article 4, paragraph 1, of the Paris Agreement:	See 6(a) and 6(c) above.