SECTOR ACTION PLAN FOR ENVIRONMENT AND CLIMATE CHANGE

General Economics Division (GED)
Bangladesh Planning Commission
Government of the People's Republic of Bangladesh
October, 2021

Sector Action Plan for Environment and Climate Change

[FY2020-21 to FY2029-30]

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M. A. Mannan, MP
Honourable Minister
Ministry of Planning
Government of the People's Republic of Bangladesh

Message

It gives me immense pleasure to know that General Economics Division (GED) of Bangladesh Planning Commission is going to publish a report on "Sector Action Plan on Environment and Climate Change", which will work as a roadmap to overcome the challenges and to attain the goals and targets of the "Environment and Climate Change" sector.

With the ideal of the country's Father of the nation Bangabandhu Sheikh Mujibur Rahman, the present government adopted people-centered approach for the country's development. With the prudent leadership of Honorable Prime Minister Sheikh Hasina, Bangladesh has already been recommended for graduation from Least Development Country and now envisions to become an upper middle-income country by 2031 and a developed country by 2041. Sector Strategy/Plan for all sectors, will provide support to the implementation of Five-Year Plans. These sector action plans will be a useful tool to assist the sector divisions as well as the line Ministries/ Divisions to identify appropriate projects/programmes in order to achieve the long term goals of the respective sectors.

The adverse impact of climate change on environment may pose a hindrance to the pace of the development journey of Bangladesh. Being one of the most dynamic and cross-cutting sector in Bangladesh, this sector highly demanded a sector action plan for coordinated development approach. This sector action plan will help to achieve the goal of SDGs, Five Year Plan along with the Bangladesh Delta Plan 2100.

I would like to take the opportunity here to appreciate the efforts of the GED of the Planning Commission in bringing out this publication. This is the first sector action plan for the "Environment and Climate Change" sector, therefore the officials of GED deserve special appreciation for this. I would also like to offer my thanks to Giz for providing technical and financial support for preparation of this sector action plan,

I hope that the contents of this publication will fulfill the needs of development policy makers, development partners, NGOs, academics, other practitioners, researchers and students for tracking the initiatives to combat the challenges in the "Environment and Climate Change"

(M. A. Mannan, MP)

Dr. Shamsul Alam
Honorable Minister of State
Ministry of Planning
Government of the People's Republic of Bangladesh

Message

Formulation of the Sector Action Plan (SAP) on Environment and Climate Change is a remarkable attempt in the planning history of Bangladesh intending to reduce the gaps in implementation and achieve related targets stipulated in the Five Year Plans. It is an important milestone that the General Economics Division (GED), Planning Commission has completed for such diversity sector.

Beside preparation of the long, medium and short term plans and the public investment programme (ADP), preparation of sector action plan (SAP) by the Sector/ Division is also a mandate of the Planning Commission. But this was remained unaddressed for a long time. The demand for preparation of SAP became more pressing in the backdrop of strategic shift in policy of Government for preparation of the FYP document from the investment nature of document to strategic and indicative planning process from the 6th FYP (FY 2010- 2015).

The 7th FYP emphasized that an action plan for each sector be prepared based on the goals and targets of the plan document. In accordance with the provision during my tenure as the Member of GED, the initiative to formulate SAP was undertaken. As part of this endeavor, two sector action plans for "Education and Technology" and "Economic Governance" sector had already been formulated. GED formulated this third SAP on "Environment and Climate Change" with assistance from the GIZ funded Adaptation to Climate Change into the National and Local Development Planning (ACCNLDP) project. The Covid-19 pandemic delayed the formulation of the SAP significantly. During this time, as 8th FYP has been published, this SAP actively considered the actions suggested in the 8th FYP also.

The Ministries/ Divisions and agencies often may find it difficult to follow the Five Years Plans as they are mostly indicative and strategic. Consequently, in most cases, Plans remain unused and there might be duplication of work or lack of synergies among the line Ministries/ Divisions. I hope preparation of SAP by the Planning Commission will guide the line Ministries/ Divisions to identify appropriate projects consistent with the objectives of the current FYP.

Bangladesh is one of the most susceptible countries in the World to the consequence of climate change, which bears a significant risk to the economic development of the country. The relationship between climate and environment and other sectors is "intensely cross-cutting". Despite the challenges, Bangladesh is always a frontrunner among the developing countries to combat climate change. Our effort, particularly adapting to the adverse impacts of climate change, have been praised by global community many times. As a recognition of this our Honorable Prime Minister was awarded "Champions of the Earth" by the United Nations.

The Sector Action Plan for Environment and Climate Change can be used as the podium by stating, elaborating and viewing the path for attaining the complex track for sustainable economic growth and development under deep uncertainties considering both national development vision and global agenda.

I would like to thank the concerned officials of GED and GIZ expert for their dedication with which they have worked hand in hand to complete this work. I hope this publication will serve as a reference book for all stakeholders including policy-makers, practitioners, academics, researchers and students dealing with Environment and Climate Change sector.

(Dr. Shamsul Alam)

Mst. Nasima Begum
Member (Secretary)
General Economics Division (GED)
Bangladesh Planning Commission

Message

General Economics Division (GED) is delighted to present the Sector Action Plan (SAP) on Environment and Climate Change (ECC) with a goal to achieve the sector specific targets stipulated in the Five Year Plans and other policy papers. The SAP ECC is conceptualized as a sectoral document, a "living document", which will be updated periodically with the progress of the FYPs.

Climate change is now considered as one of the greatest challenges facing not only nations and regions but also the global community and the integrity of the Planet Earth itself. Bangladesh has achieved sustained economic development during the last 12 years and is projected to continue this sustained growth with a faster rate in the years to come. However, climate change is considered as an inevitable factor that severely challenges the country's ability to sustain the growth. Bangladesh is among the countries that are expected to be worst affected by climate change.

In this purview, GED took the initiative to formulate the Sector Action Plan on Environment and Climate Change with the technical and financial support of German Agency for International Cooperation (GIZ). During formulation of this document, rigorous consultation was conducted with the line Ministries/Divisions, Agencies, academicians, professionals, experts, civil society members and other relevant stakeholders. This document is expected to guide the relevant Ministries and Agencies to initiate their activities in a planned way so that the targets of this sector can be achieved. Specific projects/programmes have been identified to increase the investment in this sector significantly. This publication will be useful to discussion and dialogue with the development partners to reshape their strategy of partnership and cooperation for creating more resilient and safe environment for our future generations.

Let me take here the opportunity to thank Dr. Shamsul Alam, Honourable Minister of State, Ministry of Planning, who took the initiative to formulate this sector action plan during his tenure as the Member (Senior Secretary) in GED. His unique leadership and GED. His unique leadership and active engagement in formulation of this document made it a comprehensive one. I acknowler gratitude for his enduring support. I also sincerely thank our Honourable Planning Minister M M. A. Mannan, MP for his guidance, encouragement and support in bringing out this document. Thanks are also due for my GED colleagues for their continuous effort to make the document inclusive and focused. Last but not the least, I like to put on record my grateful thanks to GIZ for providing technical and financial assistance to this study document.

(Mst. Nasima Begum)

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List of Abbreviations

Acronym	Abbreviations
ADB	Asian Development Bank
ADP	Annual Development Programme
AF	Adaptation Fund
APA	Annual Performance Agreement
AQI	Air Quality Index
ASC	Army Services Corps
AWRD	Agriculture, Water Resources and Rural Institutions Division
BARC	Bangladesh Agriculture Research Council
BARI	Bangladesh Agriculture Research Institute
BBS	Bangladesh Bureau of Statistics
BCCRF	Bangladesh Climate Change Resilience Fund
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BCCT	Bangladesh Climate Change Trust
BCIP EFCC	Bangladesh Country Investment Plan for Environment, Forestry and Climate Change
BDHS	Bangladesh Household Survey
BDP2100	Bangladesh Delta Plan 2100
BDT	Bangladeshi Taka
BFIDC	Bangladesh Forest Industries Development Corporation
BFRI	Bangladesh Forest Research Institute
BFRI	Bangladesh Fisheries Research Institute
BINA	Bangladesh Institute of Nuclear Agriculture
BIWTA	Bangladesh Inland Water Transport Authority
BLRI	Bangladesh Livestock Research Institute
BMDA	Barind Multi-Purpose Development Authority
BNH	Bangladesh National Herbarium
BPATC	Bangladesh Public Administration Training Centre
BPD	Bangladesh Power Division
BRRI	Bangladesh Rice Research Institute
BSMRMU	Bangabandhu Sheikh Mujibur Rahman Maritime University
BUET	Bangladesh University of Engineering and Technology
BWDB	Bangladesh Water Development Board
C3ER	Center for Climate Change and Environmental Research
CBA	Community Based Adaptation
CC	Climate Change
CCA	Climate Change Adaptation
ccGAP	Climate Change and Gender Action Plan
CCM	Climate Change Mitigation
CDC	Centres for Disease Control and Prevention

Acronym	Abbreviations
CDM	Clean Development Mechanism
CEGIS	Center for Environmental and Geographic Information Services
CFF	Climate Fiscal Framework
CIF	Climate Investment Fund
CREL	Climate Resilient Ecosystem and Livelihood
CTCN	Climate Technology Center and Network
DBHWD	Department of Bangladesh Haor and Wetlands Development
DDM	Department of Disaster Management
DGHS	Directorate General of Health Services
DIA	Disaster Impact Assessment
DLS	Department of Livestock Services
DOE	Department of Environment
DOF	Department of Fisheries
DPHE	Department of Public Health Engineering
DRR	Disaster Risk Reduction
DU	University of Dhaka
EbA	Ecosystem based Adaptation
ECA	Ecologically Critical Area
ECC	Environment and Climate Change
ECCDS	Environment, Climate Change and Disaster Statistics
ECOSOC	United Nations Economic and Social Council
EFCC	Environment Forestry Climate Change
EIA	Environmental Impact Assessment
EQI	Environmental Quality Index
ERD	Economic Relations Division
FAO	Food and Agriculture Organization
FD	Forest Department
FYP	Five Year Plan
GCF	Green Climate Fund
GCM	General Circulation Model
GED	General Economic Division
GEF	Global Environment Facility
GIZ	German Society for International Cooperation GmbH (English)
GoB	Government of Bangladesh
GW	Groundwater
HIC	High Income Country
HMSS	Bangladesh Health and Morbidity Status Survey
HSD	Health Services Division
ICCCAD	International Center for Climate Change and Development
ICT	Information and Communication Technology
IDCOL	Infrastructure Development Company Limited
IFRC	The International Federation of Red Cross and Red Crescent Society

Acronym	Abbreviations
IMED	Implementation, Monitoring and Evaluation Division
INDC	Intended Nationally Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
IRD	Internal Resources Division
IUCN	International Union for Conservation of Nature
IWFM	Institute of Water and Flood Management
IWM	Institute of Water Modeling
JCM	Joint Crediting Mechanism
JU	Jahangirnagar University
LAPA	Local Adaptation Plans of Action
LDC	Least Development Country
LGD	Local Government Division
LGED	Local Government Engineering Department
LGIs	Local Government Institutes
MDG	Millennium Development Goals
MICS	Multiple Indicator Cluster Survey
MIE	Multi Lateral Implementing Entity
MoA	Ministry of Agriculture
MoC	Ministry of Commerce
MoDMR	Ministry of Disaster Management and Relief
MoEFCC	Ministry of Environment, Forest and Climate Change
MoF	Ministry of Finance
MoHPWD	Ministry of Housing and Public Works
MoI	Ministry of Industries
MoLGRDC	Ministry of Local Government, Rural Development and Cooperatives
MoP	Ministry of Planning
MoPA	Ministry of Public Administration
MoPEMR	Ministry of Power, Energy and Mineral Resources
MoRTB	Ministry of Road, Transport and Bridges
MoS	Ministry of Shipping
MoWCA	Ministry of Women and Child Affairs
MoWR	Ministry of Water Resources
NAP	National Adaptation Plan
NAPA	National Adaptation Programme of Action
NARS	National Agricultural Research Institute
NASP	National AIDS/STD Programme
NBR	National Board of Revenue
NbS	Nature based Solutions
NDA	National Designated Authority
NIE	National Implementing Entity
NILG	National Institute of Local Government
NPI	National Priority Indicator

Acronym	Abbreviations
NSDS	National Sustainable Development Strategy
NTP	National Tuberculosis Control Programme
NTRP	National Tiger Recovery Programme
PA	Protected Area
PC	Planning Commission
PD	Programming Division
PES	Payment for Ecosystem Services
PHC	Primary Health Care
PKSF	Palli Karma Sahayak Foundation
PM	Particulate Matter
PMO	Prime Minister's Office
PP2041	Second Perspective Plan, 2041
PPP	Public Private Partnership
PPPA	Public Private Partnership Authority
PWD	Public Works Department
RCM	Regional Climate Model
RCP	Representative Concentration Pathways
RDCD	Rural Development and Cooperative Division
RHD	Roads and Highway Department
SAP	Sector Action Plan
SAP ECC	Sector Action Plan for Environment and Climate Change
SDGs	Sustainable Development Goals
SID	Statistics and Informatics Division
SLCPs	Short Lived Climate Pollutants
SREDA	Sustainable and Renewable Energy Development Authority
SVRS	Sample Vital Registration System
SW	Surface Water
SWOT	Strength Weakness Opportunity Threat
UNEP	United Nations Environment Programme
UMIC	Upper Middle Income Country
UNAID	United Nations Programme on HIV and AIDS
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WARPO	Water Resources Planning Organisation (WARPO)
WASA	Water Supply and Sewerage Authority
WB	World Bank
WHO	World Health Organization
WMO	World Meteorological Organisation

Executive Summary

Bangladesh is highly vulnerable to climate change, and the adverse impact of climate change on the environment may hinder the pace of the development vision of Bangladesh. In contrast, Bangladesh is striving towards achieving LDC graduation by 2026, Upper Middle-Income Country status by 2031 and High-Income Country status by 2041. Therefore, the Government of Bangladesh needs to make significant investments holistically at national and local levels to address these challenges. Against this backdrop, the Sector Action Plan for Environment and Climate Change (SAP ECC) has been prepared. It aims to ensure environmental sustainability, climate resilience, and economic growth by orienting key institutions and actors to bring national policies addressing environment and climate change to concrete action and sustenance of that practice. This SAP ECC envisions stating, elaborating and viewing the path for attaining the complex track for sustainable transformational economic growth and development for enhanced resilience of the nation against deep uncertainties of climate change and environmental degradation.

The scopes of the ECC sector have been devised in line with the 7th and 8th Five Year Plan in 9 thematic areas to fulfil three broad objectives, which are as follows:

A. Addressing climate change adaptation and mitigation for enhanced climate resilience

- T1: Local Level Climate Change Adaptation and Resilient Infrastructures
- T2: Green Growth and Low Carbon Development

B. Addressing environment management for sustainable development

- T3: Urban Environment Management
- T4: Pollution Control and Waste Management
- T5: Blue Economy
- T6: Forest, Ecosystem and Biodiversity
- T7: Food Security, Social Protection and Health

C. Developing enabling environment and capacity for Environment and Climate Change

- T8: Institutional Strengthening, Coordination and Governance
- T9: Research, Innovation and Capacity Development

The key issues and challenges covered under these thematic areas are mostly related to transforming prioritized actions of adaptation from national level to local level to enhance resilience of the community, livelihood improvement and protection from adversities of climate change and environmental degradation, gender inclusion, reducing loss and damages from climate change-induced disasters, ensuring food and nutrition security and reducing malnutrition, mainstreaming of Nature-based Solutions (NbS) as an efficient tool for both adaptation and mitigation, low impact development of cities, accelerating green growth and expansion of renewable energy, pollution control and waste (solid, liquid, e-waste, hazardous/chemical waste) management, conservation of forest, ecosystem and biodiversity including the ocean ecosystem to unlock immense potential of harnessing benefits from this development space, implementation of BDP2100, strengthening environment governance, disaster risk reduction, institutional strengthening and promotion of research and innovations to develop the low carbon development trajectory for the country. These dominant issues and challenges are conceptualized by analysing the impacts and vulnerabilities posed by the intensive and frequent climatic and environmental hazards. Engagement of multi-sectoral stakeholders is anticipated during the boundary's scoping considering the cross-cutting nature of the Environment and Climate change sector.

National policy frame for the ECC sector is derived, global agenda like Sustainable Development Goals (2030) are synchronized, and finally, national targets are set to determine the achievable target of the SAP. The national policy frame and different strategic actions and programmes attributed remarkable and exemplary

achievements since 2008 to date, which are undoubtedly commendable to every international and national jury, especially in the Environment and Climate Change sector, including initiating the NAP process, selection of NDA, submission of INDC, preparation of NAPA, development of BCCSAP and its implementation, 8th Five Year Plan, Perspective Plan 2021-2041, Bangladesh Delta Plan (BDP2100), National Disaster Management Plan, Mujib Climate Prosperity Plan 2030, biodiversity strategy plan, strategic waste management etc. Special programmes and initiatives are undertaken to sustain economic growth to achieve Vision 2041, even during the COVID19 pandemic. Commendable progress is revealed in the case of climate financing through BCCT; as of June 2020, the Government has allocated nearly US$ 450 million to this fund. A total of 789 projects have been undertaken, and 375 projects have been completed so far. Bangladesh accessed global funds like Green Climate Fund (GCF) and Adaptation Fund as well. Until June 2020, 4 climate change projects of Bangladesh received a grant amounting to US$94.7 million from GCF. A total of 6 readiness activities have been approved for around US$4 million. A US$10 million project has been awarded for enhancing the climate resilience of the vulnerable communities of small coastal islands and Char Islands from the Adaptation Fund. However, BDP2100 projects worth around US$2 billion should be channelized through GCF per year to tackle deep uncertainties of climate change and the environment for delta management.

The lessons learned from these successive achievements facilitated preparing this Strategic Action Plan (SAP). The SAP vested upon nine guiding principles, i.e. multidisciplinary and complementary nature of ECC sector, participatory and inclusiveness, aligned with national priorities, synergic with International Environmental Agreements (IEAs) and Sustainable Development Goals (SDGs), flexibility and robustness of formulated measures, promoting private sector engagement, ensuring financial integrity, promotion of green growth and lastly, applicability and sustainability.

National and global targets have been cascaded, synchronized national and SDG targets with ECC sector objectives to formulate 43 strategies considering the synchronized targets to be fulfilled by 2030 and beyond to achieve GoB Vision 2021 and Vision 2041. Developed strategies are as following:

Thematic Areas	Strategies for Action
T1: Local Level Climate Change Adaptation and Resilient Infrastructures	1. Promote initiatives to enhance climate resilience of communities among cross-cutting sectors and different levels 2. Integrating climate change adaptation into local level development planning 3. Ensure participation of women, marginalized groups in climate-resilient development and decision-making process 4. Integration of community and their local knowledge for sustainable climate-resilient environment management 5. Development of climate-resilient infrastructures and cities 6. Promote adaptive and flexible structural interventions to tackle deep uncertainties of climate change 7. Mainstream and Scaling up Nature-based-Solutions (NbS) for Climate Change Adaptation
T2: Green Growth and Low Carbon Development	1. Reducing carbon emission through introducing innovative low carbon technologies, pro-forestation, afforestation and increased use of renewable energy 2. Introduce and promotion of low carbon development and green infrastructures 3. Promotion of investment for Nature-based-Solutions (NbS) to accelerate green growth

Thematic Areas	Strategies for Action
T3: Urban Environment Management	1. Ensure sustainable management of urban environment considering climate change and other environmental degradation 2. Integrate Low Impact Development (LID) or Best Management Practices (BMP) for urban environment development and management 3. Increase green areas and biodiversity in Urban areas 4. Ensure conservation and protection of urban wetlands and ecosystem
T4: Pollution Control	1. Improvement of pollution control mechanism in Bangladesh 2. Ensure Beneficiary Pays Principle 3. Ensure strict enforcement of the 'Polluter Pay' principle 4. Development of improved waste (solid, liquid, e-waste, medical, chemical/hazardous etc.) management system 5. Introduce and encourage 4R and bio-initiatives for waste management to turn 'waste' into 'energy.'
T5: Blue Economy	1. Sustainable and Integrated Water Resources Management aligned with BDP2100 and SDGs considering adversities of climate change 2. Turn 'Blue' into 'Resources', and it's wise Harness 3. Establish a policy framework for unlocking the potentials of the blue economy 4. Ensure conservation and sustainable use of the coast and marine resources
T6: Forests, Ecosystem and Biodiversity	1. Ensure conservation and sustainable management of Forests, Ecosystem and Biodiversity 2. Encourage wise use of wetlands and introduce and integrate 'Payment for Ecosystem Services' in development planning 3. Ensure wildlife conservation and its habitat 4. Promote pro-forestation along with afforestation for conservation of forest, ecosystem and biodiversity
T7: Food Security, Social Protection and Health	1. Ensure increased agricultural productivity in the face of environmental problems and climate change adversities 2. Promote research and extension of stress-tolerant varieties or species 3. A massive expansion of climate-smart agriculture practices 4. Promotion of agricultural diversification and growth of horticultural crops 5. Crop zoning, land use planning and promotion of precision agriculture 6. Ensure food and nutrition security, social safety net and good health against the negative impact of climate change and unexpected pandemics like COVID19

Thematic Areas	Strategies for Action
T8: Institutional Strengthening, Coordination and Governance	1. Enhance collaboration among public, private sectors, GO/NGO, Civil Societies and Academia 2. Ensure both vertical and horizontal coordination among ministries and agencies 3. Improvement of governance of environment and climate change through integrated and coordinated enforcement mechanism increased transparency and accountability 4. Promote and ensure proper and effective use of enforcement tools and techniques 5. Ensure availability and accessibility of climate finance in a sustainable way to facilitate investment for climate change adaptation and mitigation 6. Promote private sector engagement in climate financing along with public sector 7. Enhance the use of ICT for knowledge, data and information sharing
T9: Research, Innovation and Capacity Development	1. Enhance institutional capacity and human skill development to mainstream climate change and environmental issues into the development planning and implementation process 2. Encourage innovative research and knowledge management to bridge the lesson learned with emerging developments 3. Enhance opportunities for collaborative research with academia

Based on these strategies, 103 projects under 9 themes have been proposed for 10 years of implementation starting from 2020-21, i.e. 8th FYP till 2030 (9th FYP), with a total investment cost of BDT 133,589 crore. All these projects are proposed as high priority projects to be initiated during the 8th Five Year Plan. Among the nine thematic areas, Local Level Climate Change Adaptation and Resilient Infrastructures (T1) and Pollution Control (T4) top the budget allocation priority with 25% and 18% allocations, respectively. In the two phases of FYPs (considering ten years span of SAP), a full 54 short term (up to 3 years), 44 medium (up to 6 years) and five long periods (up to 10 years) projects have been proposed with BDT 13559 crore, BDT 105930 crore and 14100 crore BDT respectively. For the phasing and duration of projects, the highest investment would be needed in FY 2023-24, which is estimated at BDT 27894 crore as compared to the lowest investment of 705 crore BDT in both FY 2028-29 and FY 2029-30. However, the interim update of this SAP ECC after every three years may add additional or adjusted investment needs in the ECC sector.

In a nutshell, 58% of total investment are proposed for 55 projects to be spent for Environment management, 38% for 27 projects to address Climate Change Adaptation and Mitigation for Climate Resilience and the rest 4% for 21 projects to develop enabling environment and capacity for Environment and Climate Change. As a lead implementing ministry, the highest budget has been allocated for MoWR, which is around 30% of total investment, followed by MoLGRDC (approximately 25%), MoEFCC (about 20%), MoPEMR (around 10%), MoI (4%), MoA (3%) and MoDMR (3%). Approximately 2% budget has been allocated to implement Mujib Climate Prosperity Plan Decade 2030 by the MCPP Unit of PMO. The rest are distributed among MoFL and BBS under MoP.

Projects developed under the Sector Action Plan (SAP) will be undertaken by the government and implemented through different line agencies under other ministries and receive specific fund allocations. As the prime agency, MoEFCC will spearhead the implementation of the bulk of the projects through its agencies such as DoE, FD, BFIDC, BCCT, BFRI etc. The projects will be prioritized, and budget allocations will be adjusted according to project priority and implementation timeframe. Other ministries and line agencies are also integrated with this cross-cutting sectoral plan. They are DBWHD, WARPO, BWDB, CEGIS, IWM under MoWR, DAE, NARS Institutes under MoA, DLS, DoF, BFRI, BLRI under MoFL, LGD, City Corporations, WASAs, RDCD, LGED,

DPHE under MoLGRDC, SREDA, EMRD under MoPEMR, DDM under MoDMR, MoI, BBS under MoP and Prime Minister's Office (PMO). At the same time, other stakeholders are also identified as supporting entities. These are AWRD, GED and PD of Planning Commission, MoWCA, MoS, MoC, MoRTB, LGIs, District Administration, Academia, Private sectors, IUCN, ICCCAD, C3ER, BSMRMU, Industrial Police, BMDA, IDCOL, PKSF etc.

The SAP ECC will not remain limited to these mentioned agencies or ministries but keep close coordination with others such as development partners, civil society, private sectors, regional and global networks, NGOs or INGOs for fruitful implementation of the plan.

The mandates and functions of the key implementing entities related to ECC, suggested following risks and challenges, have explicitly highlighted:

- Stakeholder consultation,
- Desk review of government policy references, i.e. Climate Fiscal Framework 2014, BCIP EFCC etc.,
- Inter-sector and inter-ministry coordination,
- O&M related budget allocation,
- Weaker prioritisation mechanism,
- Insufficient human resources, fund allocation for research and knowledge generation,
- Monitoring, transparency and evaluation mechanism

Hence, a National Environment and Climate Change Unit (NECCU) has been proposed to enhance the management, coordination and monitoring of the implementation of SAP ECC, which may be established either in MoEFCC or in the General Economics Division (GED) of the Planning Commission. This unit will ensure management, coordination, planning, selection of priority projects, external coordination, channelling finance, monitoring and evaluating SAP-ECC implementation by the result-based framework. It would also provide required technical and other support with input from relevant ministries, line agencies, departments, academia, researchers and the private sector.

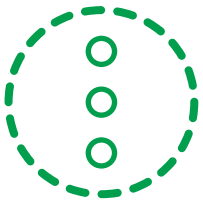
This unit will be supported by five different cells, i.e. Management and Coordination Cell, Planning, Appraisal and Project Selection Cell, External Coordination and Finance Cell, Monitoring and Evaluation Cell and Technical and Other Support Cell. However, a full-fledged study would be required to detail the structure and tasks of this unit and identify the suitable institution where the proposed unit would be better fitted. This unit will strengthen the existing institutional framework. Yet, a few more strategies have been suggested to strengthen the current implementation mechanism further. Budget allocation for Operation and Maintenance (O&M) needs to be increased to implement the projects successfully. Well-organized and robust coordination between the key agencies and other line agencies must be ensured for the successful planning and execution of projects. Prioritization of long term or permanent strategies instead of short-term response-based strategies need to be ensured. Mandates should also be updated (if required) to address ECC related issues. Training on the environment and climate change for the relevant staff need to be organized regularly. There is a tremendous undiscovered opportunity to engage the private sector in ECC related projects which should be encouraged. More research funds need to be allocated so that key implementing agencies can conduct their research to develop ownership. Along with a robust coordination mechanism, effective and holistic monitoring and evaluation mechanisms need to be established to successfully manage a project, understand the project's outcome, and prepare a future strategy based on the experience. The agencies' ownership attitude needs to be developed while implementing projects is also necessary for effectively implementing SAP.

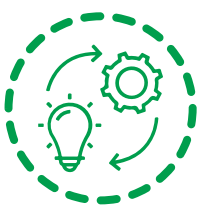
A total 41 projects have been recommended as potentially suitable for private sector engagement. The engagement has been anticipated considering an investment or as implementing entity or as a direct beneficiary or coordinating entity. The potentiality of private sector engagement is found on a large scale almost in every project under the

climate change mitigation related projects. However, the potentiality in adaptation initiatives is not so less, and most emphasized for waste management, pollution control, NAP and Mujib Climate Prosperity Plan, promotion of nature-based solutions and low impact developments for city landscaping, plastic management, small scale dredging, expansion of ecotourism etc. An enhanced private sector engagement mechanism hence suggested emphasizing major four steps i) Developing Enabling Environment ii) Priority Sector and Investors Selection iii) Selection of Proper Modalities and iv) Monitoring, Evaluation and Coordination followed by strategies under each step. Different available models (BOO, BOT, BOOT, DBFOM) under the Public-Private-Partnership (PPP) policy have been suggested to select suitable engagement modalities with national or international funding facilities.

The Government channels every year resources for significant investment in projects/programmes 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, which is nearly a fifth of the US$5.7 billion the estimated climate adaptation finance needs by 2050. However, in future huge climate investment urges ease in accessibility of international funds like Green Climate Fund (GCF), Climate Investment Fund (CIF), GEF or bilateral or multilateral funds; thus, SAP ECC outlines concrete financing strategies. Enhanced institutional capacity is a pre-condition to overcome the access barriers as most of these funds follow high standard fiduciary systems and environmental and social safeguards. Many multi-lateral development partners run global readiness programmes for LDCs to access international climate finance (i.e. GIZ, UNDP, GCF etc.). Alongside the climate fund, environment or biodiversity-related funds like Nature+ Accelerator are also recommended to be explored. Ministry of Finance and ERD as an NDA to GCF are responsible for maintaining this external coordination and funding arrangements coordinating with BCCT, IDCOL, PKSF, Development Partners like ADB, WB, UNDP, KfW and private sectors. Further, emphasis has been given to increase NIEs accreditation.

Strong coordination, monitoring and evaluation actions are recommended with a result-based monitoring framework as a SMART monitoring tool based on 115 identified unique indicators aligning with SDG indicators, NPI and APA of different agencies. Tracking the progress of ECC investments has been prescribed using the developed M&E framework by GED and IMED at system and project levels, respectively. Data collection of the M&E framework has been envisaged to be performed in coordination with the ECCDS cell of BBS. The system-level monitoring may be facilitated through tracking consistent progress with the National Priority Indicators (NPI) for Environment and Climate Change sector stated in the 8th Five-year Plan.





CHAPTER 1

Introduction

1.1. Context

Bangladesh is striving towards achieving the status of an upper-middle-income country by 2031, propelled by an economic boom with a growth rate of 8.15 per cent (BBS, 2019), leaving behind the Least Developed Country (LDC) status, despite its unique geographical position, poverty and enormous population pressure. However, it is considered one of the most vulnerable countries as Bangladesh is ranked 7th among the countries affected most due to climate change in 1999-2018, according to the Global Climate Risk Index 2020 published by Germanwatch. Scientific research revealed that the sea level is rising at a rate of 6-9 mm/year in the southwestern coast and southeastern 11-20 mm/year (MoEFCC, 2018). Estimates show that SLR would affect at least 1 million people in the Bangladesh part of the GBM basin by 2050 (Ericson et al., 2006; Cruz et al., 2007 in Rabbani et al., 2015). The adverse impact of climate change may hinder the pace of the development vision of Bangladesh. Therefore, the Government of Bangladesh needs to make significant investments holistically at national and local levels to address these challenges and encourage the allocation of limited investment capital to sectors and regions most at risk. The UN Member States adopted the 2030 Agenda for Sustainable Development at the Sustainable Development Summit on 25 September 2015. The Agenda contains a set of 17 Sustainable Development Goals (SDG) to address poverty, fight inequality and injustice, and tackle climate change by 2030. Bangladesh is a signatory to the SDG. The new Agenda emphasizes a holistic approach to achieving sustainable development for all on the principle of "leaving no one behind". Among the 17 SDGs, four are directly related to the environment and climate change. These are Goal 1: No Poverty, Goal 2: Zero Hunger, Goal 6: Clean Water and Sanitation and Goal 13: Climate Action; other goals are interrelated or can be called cross-cutting goals.

Further, SDG Goals-9, 11, 12, 14, 15 and 17 are closely related to environment and climate change. The Seventh Five Year Plan (7th FYP) is the key national planning document for overall development, calls for the adoption of a sustainable development strategy of Bangladesh. The 7FYP identified Environment, Natural Resource and Disaster Management as Strategic Priority Areas for which a wide variety of actions are needed for sustainable development.

Along with Five Year Plans, Bangladesh has vibrant planning tools already in place, such as Annual Development Programme and Perspective Plans to address socio-economic development in the short and long run. The Government has already taken several initiatives on the environmental and climate change issues. And accordingly formulated some essential documents; such as (i) Bangladesh Climate Change Strategy and Action Plan (BCCSAP) (2009) and update of BCCSAP is under progress and (ii) The National Sustainable Development Strategy (NSDS) (2010-2021). Recently, the hundred-year strategic Bangladesh Delta Plan (BDP2100) has been developed, the latest long-term techno-economic plan to deal with deep uncertainties due to climate change.

The economy of Bangladesh has been classified into *fourteen* sectors in the 7th Five Year Plan. The goals and objectives of these sectors have been attempted to achieve by implementing the Annual Development Program. Yet, a narrowed view in making public investments takes a holistic and integrated approach considering all these planning tools, uncertainties due to climate change, sectors, spatial and temporal connotations. There is a missing

link between the Five Year Plans and ADP. One of the major impediments to achieving plans and policies in Bangladesh is the lack of implementation.

Moreover, Ministries/Divisions and agencies find it difficult to follow the Five-Year Plan as they are primarily indicative and strategic. Consequently, in most cases, Plans remain unmet, and there might be duplication of work or lack of synergies among the line Ministries/Divisions. Against that backdrop, the Government of Bangladesh (GoB) introduced the development of SAPs in the 7th FYP – intending to reduce the gaps in implementation and achieve targets within the stipulated timeline, i.e. the implementation period of the 7th FYP. The relationship between climate and environment and other sectors is "hyper-cross-cutting", posing a significant challenge in designing the SAP ECC in Bangladesh. The SAP ECC is conceptualized as a sectoral document that will be a "living document", which will be updated intermittently with the progress of the FYPs. Therefore, "*In line with the 7th Five Year Plan, the Government intends to prepare Sector Strategy/Plan for fourteen sectors, which will provide a comprehensive outlook of sectoral goals, performances, opportunities and challenges, and above all identify policies and strategies that support the Five-Year Plans. These plans will also provide the framework for identifying public policy initiatives and projects in the public sector, including the role of government agencies in developing the sectors in partnership with other government institutions, private sector, development partners and non-government organizations*" (7th FYP, p. 144).

A general concept note for Sector Action Plans (SAP) was developed by GED and approved by the Steering Committee for SAPs on 17 May 2016. The available concept note expects the SAPs to bridge the gap between the broad framework plans, such as the perspective plan and the 7th FYP, and the implementation.

Sector Divisions of the Planning Commission are inherently vested with the responsibility of inter-sectoral coordination as this is the central agency for development planning. The sector divisions will prepare SAPs, and the Programming Division will allocate resources based on the approved Sector Action Plan (Concept Note: Sector Action Plan/Strategy p. 4). The General Economics Division (GED) will carry out the monitoring and policy guidance, collate the progress and implementation reports of sectoral agencies and provide policy feedback to the NEC (GED 2016, Concept Note: Sector Action Plan/Strategy p. 4).

According to GED, SAPs should identify gaps and propose actions and activities for achieving defined sectoral goals. SAPs are designed to be dynamic strategies that translate goals into action for different sectors (GED Concept Note, 2016, p. 2). SAPs should provide details on how sectoral objectives can be achieved. The general concept note aims to cope with global changes/trends and meet international commitments like Sustainable Development Goals (SDGs) or the Paris Agreement. Bangladesh needs to pay careful attention to create a sophisticated environment-friendly platform for economic development.

In this regard, a Sector Action Plan for Environment and Climate Change can be that podium by stating, elaborating and viewing the path for attaining this complex track for sustainable economic growth and development considering both national development vision and global agenda.

1.2 GoB Vision and Goal

The government of Bangladesh (GoB) has set the ambitions and aspirations to transform the country from a lower middle-income country towards a developed country. The set vision follows a roadmap that consists of three major milestones, i.e. Vision 2021, LDC Graduation by 2026 and Vision 2041. Some goals have been set to achieve the vision. The following sub-sections articulates the national development vision as a critical consideration of the SAP ECC.

Vision 2021

The road map for materialising the national goals to become a middle-income country by 2021 is enshrined in the Vision 2021 (General Economics Division, Planning Commission, 2012). It manifests a higher standard of living, better access to education, improved social justice and equitable socio-economic environment has been provided in the Perspective Plan of Bangladesh 2010-2021. The specific goals to achieve this vision are:

- Towards Middle Income Economy
- Food Security: Agriculture and Rural Development
- Industrialization in a Competitive World
- Opportunities from Globalization and Regional Cooperation
- Towards a Digital Bangladesh by 2021
- Energy Security for Development

The vision of the perspective plan is to implement proactive steps to protect Bangladesh from the detrimental impacts of climate change and global warming. This aims to ensure measures to shield local communities from natural hazards, implement efforts to reduce industrial and fuel-related (transport) air emissions, ensure waste management, and intend to take steps to render Bangladesh an eco-friendly location and encourage tourism.

LDC Graduation by 2026

Bangladesh is a lower middle income country of great potentiality. Despite its small area, it has been successfully managing the overall livelihoods of 160 million people. Bangladesh was included as LDC in the list of ECOSOC in 1975. Bangladesh has met all the thresholds of three categories, i.e. GNI (Gross National Income, US$1272), HAI (Human Assets Index, 72.8) and EVI (Economic Vulnerability Index, 25) for graduating from LDC in consecutive two triennial reviews by UNCDP, first in 2018 and the other in 2021. It was envisioned that Bangladesh will get Least Development Country (LDC) graduation by 2024. However, due to the COVID-19 pandemic, the exit has been deferred to 2026.

After graduation, Bangladesh will get 3 more years, i.e. till 2029, to prepare itself for a smooth transition. In this context, like any other LDC, Bangladesh will get 9 years (2021-2029) to prepare her to face the new international trade and commerce challenges, cooperation, technology and economy.

Vision 2041

The Perspective Plan 2021-2041 is adopted by the government as a continuation of Vision 2021. It seeks to take the nation to the development path dreamt by the Father of the Nation, Bangabandhu Sheikh Mujibur Rahman, targeted to eliminate extreme poverty and reach Upper Middle-Income Country (UMIC) status by 2031 and High-Income Country (HIC) status by 2041, with poverty approaching extinction. The PP2041 builds on PP2021's achievements while focusing on the positive practice experiences of existing UMICs and HICs who have already walked the growth route that Bangladesh is attempting to walk. Two principal visions underpin the Perspective Plan 2021-2041 (PP2041) are:

- Bangladesh will be a developed country by 2041, with a per capita income of over US$12,500 in today 's prices and entirely in tune with the digital world.
- Poverty will become a thing of the past in Sonar Bangla.

It is expected that the economy will join the ranks of High-Income countries by 2041. By then, the nation will enjoy access to universal healthcare. Under-employment and low-income will marginalize. The population will be literate and endowed with the latest technology and contribute in all spheres of economic activity (particularly in education, industry and services). Poverty will be an issue of the past.

And all this will be achieved without damaging the environment so that land, water and forestry resources are preserved, and citizens have access to clean air, safe water, green space and bio-diversity.

1.3. Goal and Objectives of SAP ECC

The goal and objectives of SAP ECC have been set aligned with Vision 2021, LDC Graduation by 2026, SDGs 2030 and Vision 2041. The key strategies and targets set by both the 7th and 8th Five Year Plans for Environment and Climate Change sector are accommodated in an inclusive way inside the goal and objectives.

The overarching goal of this SAP ECC is:

"To ensure environmental sustainability, climate resilience and economic growth of the nation through orientation of key institutions and actors to bring national policies, addressing environment and climate change, to concrete action and sustenance of that practice".

The overarching objective of SAP ECC is 'to assess the status of implementation of the planned actions by the major national planning on the Environment and Climate Change sector. It would also identify challenges and opportunities to ultimately propose specific interventions through mobilizing resources and monitoring and evaluation to accomplish the existing national and global targets'.

The specific objectives to fulfil the overarching aim of the SAP ECC are:

1. To develop a process of policy analysis towards harmonization of various national plans and policies so that it can be continued over forthcoming Five-Year Plans
2. To enable implementation of ECC sector initiatives integrated with a Five-Year Plan and Annual Development Programme (ADP)
3. To ensure ECC sector activities are aligned with the SDGs
4. To provide policy guidance for project formulation, assessment, appraisal and approval of new DPPs and TAPPs
5. To ensure monitoring and evaluation of the challenges and opportunities in the implementation of ECC sector initiatives through five-year plans

1.4. Formulation Process of SAP ECC

The formulation of SAP ECC is comprised of five steps and follows an organized, sequential methodology, as following-

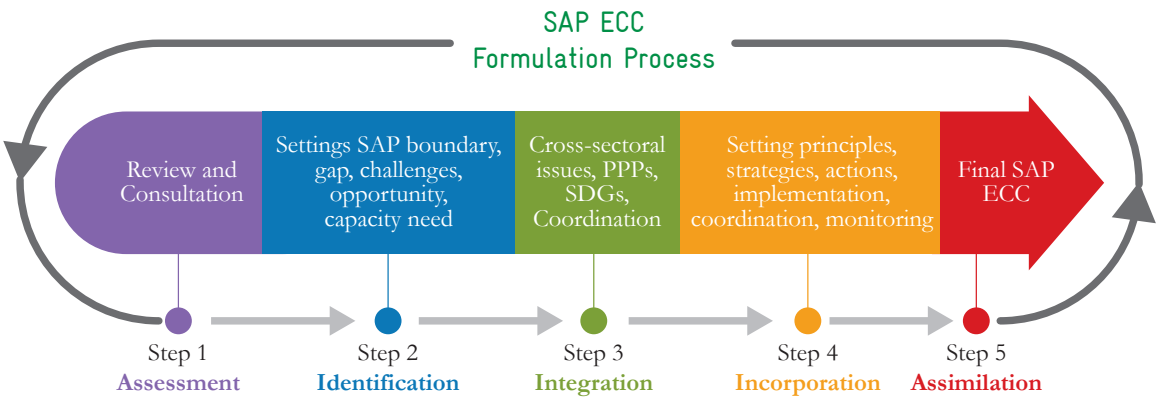


Figure 1.1: SAP ECC formulation process

Initially, situation analysis has been done (present and past condition of environment and climate change) by reviewing previous plans and existing policies/strategies, summarizing the relevant statements and identifying the gaps to prepare policy frame on the ECC sector. Then the synchronization between international and national sectoral policies relevant ECC sector has been established by reviewing international and national policies and analysing institutional capacities. All the objectives of the existing national and international policies which relate to ECC sector have also been defined separately during the reviewing process.

Then the boundaries have been devised to prepare SAP on the ECC sector aligning with the 7th FYP and 8th FYP. Due to having crosscutting nature, the ECC sector boundary has been carefully identified. After developing the ECC sector boundary, the present sector situation has been assessed and verified the objective and impact of recent, past, and future projects.

After devising that, guiding principles have been set to formulate the SAP ECC strategies and develop the action plan. For the preparation of the sector action plan, consultation with responsible agencies has also been conducted. SWOT analysis has been done for SAP to identify the internal and external forces that may influence the organization's performance and choice of strategies. With SWOT analysis results and expert advice, the sector action planning process has been started. This includes identifying possible programmes focusing on the environment, climate change, forest etc., while keeping an eye on the upcoming 8th Five Year Plan to select potential projects/ programmes for the FYP.

The scope of Public-Private Partnership (PPP) for investments has been especially explored and considered during the preparation of the action plan, along with other identified cross-cutting issues.

Based on the outcome of sector institutional capacities and situation analysis, the baseline for assessing scopes for the ECC sector action plan has been prepared. The identified contents have assisted in proper focusing and fixing of a specific target for the sector action plan. The gaps and challenges obtained from SWOT analysis have been kept in mind while preparing the strategic programmes for SAP in the ECC sector.

After formulating the plan according to the target and goal of the plan year, projects have been prioritized. Location-specific both short-term, medium-term and long-term action plan has been prepared against each strategy. A well-coordinated institutional framework has been proposed to implement action plans successfully and concrete financing strategies. Coordination mechanism, monitoring and revision of plan and capacity building of responsible institutions or opportunities to engage private sector have also been assessed for the proper implementation of the plan. Apart from the implementation mechanism, coordination and monitoring tools have been established using identified lead and significant stakeholders and monitoring indicators.

For effective monitoring, some SMART indicators have been selected in consultation with sectoral experts, programme managers and personnel, researchers and key stakeholders and identified monitoring indicators have been kept in line with the 8th Five Year Plan, Sustainable Development Goals (SDGs) and Annual Performance Agreement (APA).

CHAPTER 2

Environmental and Climatic Hazard

2.1. Devising the ECC Boundary

The 7th Five Year Plan (2016-2020) of Bangladesh has been formulated based on three core themes, i.e. accelerating inclusive growth, empowering all citizens and ensuring the sustainability of growth. National strategies under the last theme, i.e. providing the sustainability of development, are primarily addressed by the sector dealing with environment and climate change. It means higher growth and better empowerment of citizens must be done sustainably over the longer term and does not undermine the opportunities and prospects for the future generation. The Environment and Climate Change Sector based on this laid foundation, has been defined by two key issues, i.e. i) Climate Change Management and Resilience (comprised of adaptation and mitigation) and ii) Environmental Management specifically focusing on land and water management, biodiversity conservation, forest ecosystem restoration, environmental pollution control and climate-resilient development. Disaster Risk Reduction (DRR) related issues have been separated from the ECC sector, merging it under Social Security and Protection, despite mainly being aligned with climate change adaptation.

The main objectives relating to Environment and Climate Change sector have been set under the following categories:

- To attain good governance in environmental sustainability.
- To eradicate extreme poverty and achieve national food security.
- To maintain environmental health.
- To ensure sustainable city development following appropriately structured plans.
- To improve the living standard of life of rural people.
- To preserve agricultural land and to ensure production growth for food security with minimum environmental degradation.
- To hold water of wetlands including jalmohals and rivers in the dry season.
- To meet national air and water quality standards.
- To achieve tree cover, over 20% of the land surface (with tree density > 70%) and ecologically healthy native forests are restored and protected in all public forest lands (about 16% of land).
- To ensure no new extinctions of globally and nationally threatened species.
- To meet energy demands of development through a low carbon strategy.
- To reduce potential economic losses due to Climate Change (particularly from floods, drought and salinity).

To achieve these objectives, the Government aims at "transformative adaptation" rather than just "climate resilience", which implies a transformation at societal, community and national level from the current state of vulnerability to an improved state of development, climate-adaptive and resilient measures suitable to the local contexts. And needs have also been emphasized through attaining specific broad goals, including good governance in environmental sustainability, addressing population growth, ensuring the sustainability of cities with improved infrastructure, production and economic activity with minimal degradation, meeting national air and water quality standards, protecting endangered species, sustainable conservation of the Sundarbans Mangrove Forest and reducing potential economic losses from natural disasters under the environmental management category.

Furthermore, the green growth strategy has been considered under the ECC sector to improve the eco-efficiency of economic growth and enhance the synergies between environment and economy. And a sustainable development plan that needs to meet the current generation's demand without jeopardizing future generations' ability.

The 8th Five Year Plan echoed the same line of the previous five-year plan. It emphasized the importance of environmental sustainability and intensively tackling climate change to develop transformational economies of the country. The main focus on environmental and climate change outlined inside the plan is climate change adaptation and mitigation, environment management, green growth and disaster risk reduction.

This Sector Action Plan thus devised the boundary of Environment and Climate Change sector through nine (9) key Thematic Areas decrypting the issues, challenges and broad strategies outlined in the 7th Five Year Plan and the 8th Five-year plan. The key Thematic Areas for this Sector Action Plan are taken to address three overall objectives. The nine critical thematic areas covered for this SAP ECC to fulfil three general goals are as follows:

A. Climate change adaptation and mitigation for enhanced climate resilience

- T1: Local Level Climate Change Adaptation and Resilient Infrastructures
- T2: Green Growth and Low Carbon Development

B. Addressing environment management for sustainable development

- T3: Urban Environment Management
- T4: Pollution Control and Waste Management
- T5: Blue Economy
- T6: Forest, Ecosystem and Biodiversity
- T7: Food Security, Social Protection and Health

C. Developing enabling environment and capacity for Environment and Climate Change

- T8: Institutional Strengthening, Coordination and Governance
- T9: Research, Innovation and Capacity Development

Scoping of these 9 thematic areas is described below with specific issues which are covered under these thematic areas to set the specific scope of the Environment and Climate Change Sector:

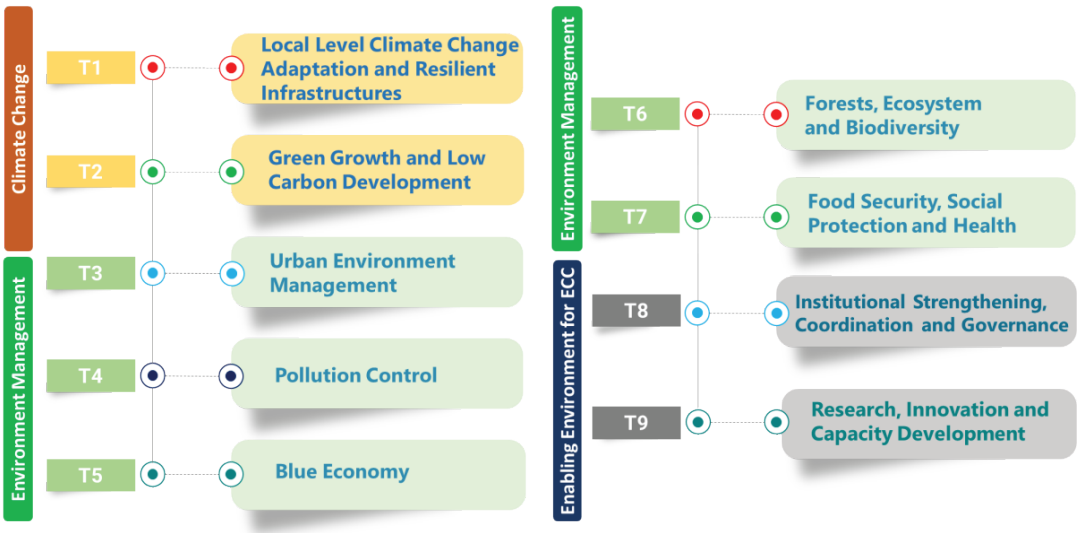


Figure 2.1: Key thematic areas covered in SAP ECC

A. Addressing Climate Change Adaptation and Mitigation for Climate Resilience

Fulfilling this objective through SAP ECC will facilitate the implementation of the Government's commitment in the 8th Five-Year Plan to take climate actions to develop and enhance climate resilience among the whole government and local government through multi-stakeholder engagement and communities. Transformational local level climate change adaptation, the establishment of climate-resilient infrastructures, promoting low carbon development and green growth are considered as priority plans in this regard, which are further specified under the following two thematic areas:

T1: Local Level Climate Change Adaptation and Resilient Infrastructures

This theme aims to transform strategic prioritization actions for climate change adaptation from the national to the local level to enhance local level climate resilience by integrating climate change adaptation into the local development planning process. It also focuses on engaging the community to make inclusive and participatory planning and development. The process would share learning to promote the participation of stakeholders. It would ensure climate resilient market system development and value chain and make available climate-friendly products. It would also incorporate native and indigenous adaptation knowledge into systematic scientific-technological innovations to reduce loss and damage by climate change-induced disasters. This would also focus on curbing internal migration and displacement and increasing alternating income-generating activities among communities.

Sea surface warming leading to sea level rise, salinity intrusion, storm surges, recurrent river floods, intensive urban floods, river bank erosion, soil degradation, extreme heat, cold snap, hails storm, lightening, disruptions in rain pattern and heat island effect etc. are some direct environmental impacts in Bangladesh caused by anthropogenic climate change.

All these impacts leading to massive losses and damages of physical infrastructures, thus slow down the pace of accelerated socio-economic development of the country. These physical infrastructures need to be revamped, rehabilitated, reconstructed and maintained with huge capital investment due to lack of prudent planning, design, implementation and maintenance considering uncertainties posed by climate change. BDP2100 (GED, 2018) recommended the integration of flexibility adaptive design and implementation principles to manage the physical infrastructures and make them climate-resilient, updating and incorporating design parameters considering climate change and its deep uncertainties. Identifying and adopting climate-adaptive and resilient measures suitable to the local contexts and needs are key challenges for Bangladesh. Therefore, Local Adaptation Plans of Action (LAPA) and Community Based Adaptation (CBA) involve empowering vulnerable communities with knowledge and support to become more adaptive. It also focuses on protection measures for the displaced people or vulnerable urban communities to the extreme and slow-onset climate events, keeping with the relevant national and international policies/ initiatives.

This theme also focuses on making physical infrastructures climate-resilient at the national and local level and secure the targeted GDP to achieve the GoB Vision 2021 and Vision 2041 aligned with the National Adaptation Plan (NAP).

Protection and security of the community and the society from climate change-induced disasters will be intensified through the actions of this theme. Emerging eco-engineering solutions or Nature-based Solutions (NbS) are emphasized to enhance the efficiency of climate investment and disaster risk reduction.

Moreover, Disaster Impact Assessment (DIA) Tool' needs to be included to screen DPPs prepared by different Ministries and Government agencies to do the projects climate change-induced disaster resilient and minimize the scope of the proposed development initiatives in aggravating any existing risk or generating new risks. Department of Environment (DoE), Bangladesh Climate Change Trust (BCCT), Bangladesh Water Development Board (BWDB), Water Resources Planning Organisation (WARPO), Department of Bangladesh Haor and Wetlands Development (DBHWD), Local Government Engineering Department (LGED), Roads and Highways Department (RHD), Public Works Department (PWD), Department of Public Health Engineering (DPHE), City Corporations and WASA under Local Government Division (LGD), Department of Fisheries (DoF), Department of Livestock Services (DLS), Department of Disaster Management (DDM), Rural Development and Co-operatives Division (RDCD), Forest Department (FD), Ministry of Women and Children Affairs (MoWCA) and Ministry of Industries (MoI) can contribute under this theme. These agencies should maintain strong collaboration and coordination with aligned ministries like MoEFCC, MoWR, MoA, MoI, MoLGRDC, MoFL, GED, AWRD, and PD under MoP to plan and design, appraise and implement appropriate development projects. Sector Divisions of the Planning Commission may take the role of appraisal of climate change and disaster risk-informed project developing and integrating suitable tools like DIA framework or climate change screening tools. Overlapping of jurisdiction among inter and intra ministerial agencies like BWDB, City Corporations and WASA are a big challenge in resolving cross-cutting issues which need to be coordinated strictly with assigned roles and responsibilities.

T2: Green Growth and Low Carbon Development

Despite having quite a low contribution (0.35% of global emission as per MoEFCC (2018) to the generation of greenhouse gases, Bangladesh government mainly focuses on climate change mitigation through its five-year plan.

Bangladesh has committed to reduce greenhouse emissions from agriculture and urban waste management and the development of forestry resources. This regard explores all avenues, including mechanisms under REDD (Reducing Emission from Deforestation and Forest Degradation). Some institutional challenges like weakness in analysing and seizing available opportunities, lack of ability of energy-saving sectors, weakness in coordination and communication among institutions and inadequate investment in research but mainstreaming climate change issues like mitigation and adaptation into planning and implementation will make it easier to achieve the desired results In this regard, enhancement of the understanding of Low Carbon Development (LCD) and renewable energy, improvement of capacity in analyzing available opportunities, enhancing the ability of energy-saving sectors, improvement in coordination and communication among institutions, ensuring investment in research and innovation and other activities like GHG emission from manufacturing industries, preparing a roadmap towards Nationally Appropriate Mitigation Actions (NAMA) and mainstreaming the National Action Plan on Short-lived Climate Pollutants (SLCP), deserves priority attention and intervention.

Further, FYP emphasized green growth as a necessary, efficient and affordable development strategy. Yet, considerable challenges are impeding the proper implementation of a green growth strategy includes planning and coordination, limited capacity of officials, existing market inefficiencies, lack of mutually reinforcing actions across local and national levels of government, inadequate financing and green accounting. Therefore, some areas are identified to be addressed under the ECC sector comprising establishment of clear vision, targets and baselines, employment of well-designed planning coordination processes and tailored strategies to mitigate market-driven externalities, engagement of private sector in various facts of green growth, innovation of financial tools mobilizing private investment in green growth sectors, green banking and promotion of green accounting. To fulfil the pledge of the GoB through NDC, devised actions under this thematic will strive for developing into reality the low impact development pathway and enabling environment for green growth.

DoE, BFD, MoEFCC, LGD, WARPO, BCCT, MoA, SREDA, MoPEMR, MoI, MoC, MoS, MoRTB can be major implementing agencies under this theme. Strong coordination with financial institutions like Bangladesh Bank may be required along with SREDA and MoI. Collaboration with private sector implementing entities like

IDCOL, PKSF, UNDP, GIZ, KfW, BRAC etc., is highly recommended to shoulder the investment burden on GoB to flourish the renewable energy-based initiatives.

B. Addressing Environment Management for Sustainable Development

Five thematic areas are considered to manage environmental issues with prudence to foster sustainable socio-economic development towards the nation's prosperity. Specific topics covered under these themes are described below:

*T*3: Urban Environment Management

The government is striving to turn 'village into the city' as part of the development plan set by Vision 2041. However, lessons learned from rapid urban sprawl in major divisional cities like Dhaka or Chattogram indicates serious challenges to managing the urban environment in sustainable and resilient ways if proper strategic actions were absent. Increased paved areas, reducing open and green spaces through unplanned infrastructures development, waste generation and pollution of air, water and soil, air and noise pollution due to increased traffic, heat island effect due to climate change and a more significant portion of paved areas, massive industrial pollution leading to the death of rivers, degradation of urban wetlands and ecosystem through encroachment, safe water supply, sanitation and hygiene, tackling sudden pandemic like COVID19 etc. are major issues, and challenges in urban environment triggered from the transformation. After that, this theme aims at tackling those challenges in a prudential manner and make urban communities resilient that will facilitate the change of rural areas to metropolitan cities in a sustainable way. A well-structured and planned urban environment management is expected to make resilient, green, pollution-free and sustainable cities. Specifically, planned urbanization, protection and conservation of urban wetlands, ecosystem and climate-resilient, ecosystem-based adaptation (EbA), green and Low Impact Development (LID) measures for resilient cities are included under this thematic area. Department of Environment (DoE) as a regulatory body, Bangladesh Climate Change Trust (BCCT) and Local Government Division (LGD), Bangladesh Water Development Board (BWDB), Forest Department (FD), Department of Disaster Management (DDM), Public Works Department (PWD), Rural Development and Cooperative Division (RDCD), Ministry of Industries (MoI), Ministry of Roads, Transport and Bridges (MoRTB) are expected as key implementing agencies under this theme. Similar to the theme of Local Level Climate Change Adaptation (T1), overlapping jurisdiction among inter and intra ministerial agencies like BWDB, City Corporations, City Development Authorities like RAJUK, CDA, KDA and WASA is a big challenge in resolving cross-cutting issues under this theme. Thus, strong coordination among concerned agencies and ministries are envisaged to be maintained strictly.

Figure 2.2: Green city vs polluted city

T4: Pollution Control

Despite the continuous effort and important initiatives from GoB, like shifting tannery industries from inside to outside of Dhaka, central ETP installation adopted a 3R strategy for waste management, strict and systematic solid waste collection and disposal system in city corporations and municipalities, regular river water quality monitoring, surface water clean-up drive, imposing strict enforcements and punishments through mobile court, several issues and challenges are still to be addressed to get rid of environmental pollution. Major challenges are following: changing citizen behaviour and corporate social responsibilities for pollution control and waste management, management of solid, liquid and e-waste with zero discharge policy, managing hospital waste, hazardous and toxic waste, pollution from faeces, persistent organic pollutants (PoPs), fecal sludge management at the local level, ensuring installing and functionalities of Effluent Treatment Plants (ETPs), air quality improvement, proper monitoring of industrial pollution, enforcement of punishments to polluters, replacement of traditional brick kilns and rice parboiling units, halt open incineration of Municipal Solid Waste (MSW), storm water quality control, managing environmental risk to health etc. Introducing and implementation of 'polluters pay' principle is regarded as a priority strategic action in these aspects.

Department of Environment (DoE) and MoEFCC, WARPO, DBHWDB, FD, LGD and DoF, MoI, MoC, MoS and MoRTB are considered key implementing agencies under this theme. Strong coordination and liaison with the local administrations and industrial police are needed to implement strict enforcement against environmental degradation. However, other relevant ministries and their attached departments can be integrated with the coordination mechanism, most likely through Bangladesh Climate Change Trust (BCCT) and DoE. Provisions of private sector engagement under this theme can also be explored for waste management, pollution control, implementing green development (LID) in cities, and installing ETP in industries.

T5: Blue Economy

The environment and Climate Change sector have widened its scope in enormous areas due to its very cross-cutting nature. The livelihoods and economy of Bangladesh are largely dependent on the integrated management of land and water. That triggered the vision of Bangladesh Delta Plan 2100 for proper water resources management, which logically emphasized resources underwater and its wise harnessing for economic growth, poverty reduction, food and nutritional security issues.

Sustainable Development Goal 14: Life below water targets to manage, protect and conserve marine and coastal ecosystems from pollution, ocean acidification, over exploitation and habitat degradation. The theme Blue Economy thus covers sustainable management and conservation of resources under water and its wise harness to contribute to the national economy aligning with the hundred-year delta vision and sustainable development agenda. Strengthening the action plan on Blue Economy and its implementation is the main objective to be considered under the theme. However, only ECC relevant prospects and actions are brought out to avoid large overlapping activities with the Bangladesh Water Development Board (BWDB) and the Department of Fisheries (DoF). Still, proper coordination may be explored and recommended here to produce the desired outcome from the action plan. The Ministry of Fisheries and Livestock (MoFL) is one of the key contributors to promoting the Blue Economy through the production and exporting of fisheries. The MoFL is facilitating the livelihoods of fishermen at the Bay of Bengal through World Bank supported "Sustainable Coastal and Marine Fisheries Project" (July 2018-June 2023) and another project relating to Fishing Tuna and other species in the deep sea (July 2020-June 2025) only. However, other related ministries or attached departments, such as the Energy and Mineral Resources Division (EMRD), the Ministry of Power, Energy and Mineral Resources and Ministry of Shipping, Ministry of Industries etc., are needed to be included while mapping the organizations/institutions dealing with Blue Economy.

T6: Forest, Ecosystem and Biodiversity

Forest, ecosystem and biodiversity management is one of the major and integral parts of ECC sector interventions to excel the driving force of forest-dependent livelihood and income generation, maintaining ecosystem services and halting biodiversity loss/degradation. The world's largest mangrove forest, the Sundarbans, protects millions of people's lives and property from recurrent storm surges, providing opportunities for alternative income generation activities, sequestrating carbon, and providing many other ecosystem services. The large wetlands,

haor and beels provide tangible and intangible benefits through diversified ecosystem services i.e. flood control, crops production, fish production, rendering habitats for different species to conserve biodiversity, adding value to the recreational activities like eco-tourism etc.

These vast resources are vital for the economy and lifeline of the country. Therefore, this theme urges strategic actions for natural resource management attributed to the forest and its ecosystem. It also focuses on protecting and conserving Ecologically Critical Areas (ECAs), management of land and wetlands ecosystem, conservation of biodiversity and its habitat, reducing wildlife crime, utilization of innovative technologies for wildlife and biodiversity management, expansion of forest coverage, greenbelt creation and maintenance, REDD+ mechanism, hill forest management and research on indigenous species etc.

Forest Department (FD) and DoE, MoEFCC, DoF, DBHWD, WARPO, CHTDB, and private sectors like CEGIS, CNRS, and IUCN can play a vital role in implementation under this theme. The private sector engagement mechanism can be outlined to attract and engage private sectors under this theme.

T7: Food Security, Social Protection and Health

This theme portrays the cross-cutting nature similar to the theme T5: Blue Economy again. Understanding climate change-water-food-nutrition nexus and climate change-health nexus are two fundamental aspects of the evident negative impacts of climate change due to frequent and intense extreme events affecting agriculture and public health. More than 20 droughts impacted Bangladesh during the last 50 years (CCC, 2009), which is tend to increase in future due to climate change significantly in the north western region of Bangladesh, as it receives less precipitation than the rest of the country. In addition, Climate change impacts irrigation water availability during the dry season for Boro and other crops like wheat and maize production may pose severe threats to the nation's food security in the future. Phenological changes due to extreme heat or cold spells and salinity, soil degradation in the southern coastal region are other major constraints for boosting agriculture production.

Further, foreign crop pests (like Fall armyworm, Blast, Mealybug, Rugose Spiraling Whitefly etc.) may be increased due to extreme climate conditions. Further, vulnerable marginal communities would face malnutrition due to the unavailability of food. Livelihoods are likely to be threatened due to the badly affected agriculture sector. Its production process is the single largest job provider and creates other sectors of employment. Thus, the economy will be affected, and climate migrants will increase as internal displacement, vector-borne diseases outbreak will be increased like global pandemic COVID19, rate of deaths due to heatstroke and high blood pressure will be improved so on. Therefore, strategies have been explored to provide access to social protection to climate migrants and vulnerable people, agriculture-dependent livelihood protection, the invention of stress (saline, drought, heat, cold and water) tolerant varieties, promoting climate-smart agriculture practices, tackling health hazards, crop diversification with high-value crops, irrigation efficiency and freshwater flow increment, sustainable fisheries management.

This theme mainly attracts and creates scope and need for strong coordination of Ministry of Environment, Forest and Climate Change (MoEFCC) with NARS institutes (BARI, BRRI, BINA, BARC), Department of Agriculture Extension (DAE), Bangladesh Water Development Board (BWDB), Water Resources Planning Organization (WARPO), Ministry of Agriculture (MoA), Ministry of Fisheries and Livestock (MoFL), Ministry of Water Resources (MoWR) and Ministry of Health and Family Welfare (MoH&FW). Bangladesh Climate Change Trust (BCCT) under the MoEFCC, GED and AWRD under the Planning Commission can be the proper channels to interact with these agencies and ministries to implement proposed actions successfully.

C. Developing Enabling Environment and Capacity for Environment and Climate Change

The enormous importance of developing enabling environment and required capacity for the Environment and Climate sector is unfolded. Hence, scopes are set under two thematic areas: strengthening institutions, governance and coordination and research, innovation and capacity development. Detailed contents of these thematic areas are outlined below:

T8: Institutional Strengthening, Coordination and Governance

The emergence of inter-sectoral and inter-ministerial coordination is reflected almost for every thematic area described earlier, requiring strengthening the existing institutional arrangement built-in for the ECC sector. The Governance for the environment scoped in the following issue: sectoral coordination on the environment and natural resources management, strengthening the EIA system as an environmental management tool, establishing accountability, update of ecological policy and plan, environmental education, awareness and environment watch, revamping functions of environment court, policy for compliance by industries, financial incentives etc.

Governance of forestry and biodiversity, in particular, includes enactment of laws & regulations, institutional strengthening, establishing accountability, land litigation, protection and restoration of endangered and threatened species. Strengthening the environmental governance thus will create suitable space for relevant actors to take their actions and consume benefits as per rules and regulations of the country. Furthermore, bringing sustainability to climate financing through ensuring accessibility and availability of public, private, development partners, and international climate funds is also an essential part of institutional strengthening, which may be covered under this theme. Representation of all mentioned key stakeholders of ECC sectors, including academia, researchers, gender and youth, with a robust coordination mechanism can bring out the best output from this thematic planning and development domain.

T9: Research, Innovation and Capacity Development

ECC related knowledge generation is essential. This can develop through research and publications, managing knowledge database, Management Information System (MIS), digital library and inventory, innovative technology and its transfer, institutional capacity development and skill development of the officials, awareness-building programmes for the community, improving training facilities, knowledge generation, sharing and management etc.

Research, innovation and capacity development theme are considered the most essential and prime issues to be integrated into this sector action plan to facilitate transformative adaptation and resilience development, fulfilling and bridging generated ECC related knowledge in Bangladesh and around the world. Research, innovation and capacity development is a continuous and gradual process integrated throughout the planning period. With this principle, this theme appeals to participation, engagement and sharing of all generated knowledge through a single podium. There already exist some platforms comprising practitioners', academicians and professionals regarding research in environment and climate change. These platforms can be used for long term capacity building and research initiatives. This theme has emphasised the engagement of young officials and their capacity development in ECC governance and global negotiations from both the public and private sectors.

All 9 themes of Sector ECC and their scopes have been defined separately; still, all formulated strategic actions under one theme will inherently facilitate the implementation of strategies under other thematic areas. Almost all of the themes have a cross-cutting nature in implications of implementation actions.

2.2. Environmental Hazard

Bangladesh is a fertile deltaic country in South Asia with a large population but limited natural resources with fertile land and a sub-tropical climate. Recently, environmental pollution and hazards have been an emergent concern in the country. With growing industrialization and urbanization, the country began to face certain ecological risks, e.g., air/water/sound pollution, land degradation, ecosystem, biodiversity and forest degradation etc., which are prominent and need proper planning for development sustainability. Besides these risks, some environmental hazards like earthquakes, soil or riverbank erosion and landslides etc., are also getting attention to protect the present and future development.

Degradation in River Water Quality

River water quality is a severe environmental risk for Bangladesh. The major causes of degradation of river water quality are the activities occurring on the surrounding land areas, including industrial effluents, agrochemical and faecal pollution, oil and lube spillage etc. Growing industrialization is key reason behind the severe degradation

of river water quality over the years. Overall, inland surface water quality drops below the permissible limit of Department of Environment (DoE) standards; however, it slightly improves in the wet/monsoon season. According to the Surface and Ground Water Quality Report (2016) of DoE the following table presents some critical parameters of water quality in major rivers in the country and around the major industrial area in Dhaka.

Table 2.1: River Water Quality Status in 2016

River	pH	DO (mg/l)	BOD (mg/l)
Padma	7.08-8.32	3.8-8.2	1.0 - 30
Meghna	6.08-7.09	0.8-7.1	0.2-8.4
Jamuna	6.76-8.19	6.4-8.5	1.2-4.2
Buriganga	6.78-7.89	0.0-6.2	2.6-50.2
Turag	6.68-8.11	0.0-6.1	1.8-70.3
Shitalakhya	6.66-7.98	0.0-12.0	0.8-38
Dhaleshwari	7.0-7.86	0.8-7.5	1.2-8.4
EQS for fisheries	6.5-8.5	≥5 mg/l	≤6 mg/l

Source: Department of Environment, 2016, Surface and Ground Water Quality Report.

Dhaka city and its surrounding areas, the capital and economic hub or central part of the country, is heavily industrialized with lots of tanneries, fabric dying industries, apparel washing and chemical processing industries, plastic industries, etc. These industrial areas are mainly contributing to the degradation of river water quality. The major rivers surrounding Dhaka, Buriganga, Turag, Shitalakhya and Dhaleshwari have degraded rapidly over the years. The dissolved oxygen (DO) concentrations of these rivers are deficient. The Biological Oxygen Demand (BOD) levels are very high and are very damaging for the ecosystem and environment. Other water quality parameters like Chemical Oxygen Demand (COD), Total Dissolved Solid (TDS) were within the permissible limit for the major rivers. Still, the limits vastly exceeded for the rivers around Dhaka city. The water quality in the Meghna river is also deteriorating with increasing industrialization along the river banks. The river water quality of the north-eastern region is mostly within water quality standards.

The rivers, khals and waterbodies around the industrial regions are heavily polluted due to uncontrolled disposal of solid/liquid wastes and heavy metals. Environmental law enforcement was not strict in the past, resulting in the present degradation of water quality. But various initiatives are ongoing by relevant ministries and agencies to enforce the environmental laws and ensure quality of industrial wastewater discharge.

Air Pollution

Air quality in Bangladesh's urban areas and industrial zones are deteriorating rapidly due to increased emissions from vehicles and industries. Air pollution in Bangladesh is mainly due to black carbon emission from vehicular emission, brick kilns, and industries. The two major air quality parameters to identify the level of air pollution are PM2.5 and PM10 According to the annual report 2017-2018 of DoE, although the other pollution indicators were within the limit, these two parameters have exceeded the permissible limit by a large margin. The main reason behind this is the number of industries, brick kilns, and traffic volume in that area. The permissible limit of average PM10 and PM2.5 is 100 and 50 $\mu g/m^3$, respectively. For heavily industrialized, densely populated areas like Dhaka, Gazipur, and Narayanganj PM10 varies in the range of 150 to 220 $\mu g/m^3$ and PM2.5 varies in the range of 80 to 90 $\mu g/m^3$ in 2017. In 2020, PM10 in these cities changed in the range of 154 to 312 $\mu g/m^3$, and PM2.5 varies in 107 to 210 $\mu g/m^3$. The Air Quality Index (AQI) value of 100 or below is considered as healthy. According to the Ambient Air Quality in Bangladesh DoE (2018) report, in Dhaka, AQI was more than 100 for 63% of days in 2017. A similar situation was also present in Gazipur (56%) and Narayanganj (61%). The situation gets worse and air quality gets tremendously deteriorates during the dry period (November to March) every year. The air quality condition in Dhaka is even worse, contributed by its large population, unplanned urbanization, heavy traffic movement and rapid industrialization.

Other air quality parameters, i.e. concentration of SO_2 and NO_2 are also above the average limit in Dhaka. This severe degradation in air quality has emerged as a severe issue of concern. According to a World Health Organization (WHO) report of 2016, air pollution kills 195,000 Bangladeshi each year. This problem is mostly

concentrated in dense urban and industrial areas around Dhaka and Chattogram. For a sustainable future, various initiatives to tackle this degradation of air quality are needed, and ongoing activities need to be strengthened.

Depletion in Ground Water Level & Quality

A deep aquifer system underlies Bangladesh with both deep and shallow groundwater resources. Groundwater levels are at or near ground level during the period August-October and lowest in April-May. The fall rate of groundwater is highest in October-November, but equally significant changes occur after January when groundwater withdrawal for irrigation starts. Due to high spatial and temporal variability in surface water availability and quality, groundwater is increasingly used to meet domestic, industrial and irrigation purposes. Metropolitan cities, including Dhaka, Rajshahi, Rangpur, Chattogram, Khulna, Sylhet, etc., extract more groundwater for urban water supply. Dhaka and the Barind region have the lowest groundwater levels both in the pre and post-monsoon seasons.

In Bangladesh, groundwater quality exhibits both seasonal and spatial patterns. Generally, water quality degrades from wet to dry season and spatially from the North to South and South Western parts of Bangladesh. Due to overexploitation, exposure to arsenic has become prevalent, posing a massive public health issue for some areas. Reports suggest that 61 of 64 districts in Bangladesh have an arsenic level above the acceptable drinking range of 0.05 mg/L. The South-East (SE) and South-Central (SC) regions are worst affected by arsenic among the hydrologic regions. Dhaka's ground water contains around 0.035 mg/L of Arsenic. Though the South-West region is relatively better than the other two regions, Khulna has alarming arsenic contamination of 0.31 mg/L. The eastern portion of the Coastal area has overall lower arsenic levels between 0.013 to 0.02 mg/L. The arsenic contamination in the Haor area is in the range of 0.022 to 0.09 mg/L. According to the Surface and Ground Water Quality Report of DoE of 2016, the pH and concentration of Iron in groundwater for the districts of Chattogram, Khulna, Barisal and Sylhet were within the EQS level for drinking water. Total hardness for all the districts was within Environmental Quality Standard EQS limit (<200 mg/L) except Khulna (224 to 390 mg/L).

Noise Pollution

Noise pollution has become a significant problem in Bangladesh, especially in all the divisional headquarters. According to a recent study by DoE, sound levels in these areas are far beyond the acceptable sound level for the human ear. According to WHO, humans' maximum tolerable noise level is 60dB without gradual loss of hearing. But In Dhaka, the average sound level is 80-110dB, which is almost twice the permissible range. The major sources of noise pollution in urban areas are traffic and loud horns. Other causes of noise pollution include loud music during social, political, and religious programs, construction work, and factory noise. The noise level for various cities varied from 47 dB (off-peak hours) to 133 dB (peak hours). A DoE study (2017) suggested that around 11.7% of the population in Bangladesh have lost their hearing due to noise pollution.

People, especially the city dwellers, are more exposed to sound pollution and eventually suffer from severe health complexities, such as blood pressure, stomach ulcers, brain stroke, amnesia and different types of mental illness. To check noise pollution, the government has introduced Bangladesh Sound Pollution (Control) Rules, 2006.

Degradation of Soil/ Land Resources

Land degradation is a severe issue for the sustainability of agriculture and the ecosystem of a country. There are six major types of land degradation in Bangladesh: Soil erosion, Salinization, Acidification, Water logging, Soil fertility depletion and Heavy metals contamination. Different part of the country is vulnerable for different types of land degradation. For example, the South-Eastern part of the country (Hilly areas), the South-Western part of the country (Khulna, Jessore, Satkhira) and the southern part of the country (Coastal belt) are susceptible to soil erosion, water-logging and soil salinization induced land degradation respectively. According to Bangladesh National Conservation Strategy, around 1.7 Mha, 1.06 Mha and 2.6 Mha land have been degraded due to soil erosion, soil salinization, and water-logging. Due to unplanned urbanization, rapid industrialization and improper disposal of huge solid and liquid wastes, especially in the metropolitan cities, the problems like soil acidification, soil fertility depletion and heavy metal contamination have intensified and caused around 3.96 Mha, 3.71 Mha and 3.0 Mha of land degradation respectively. Some of the other key factors behind land degradation include; population, intensification of agriculture; un-balanced use of chemical fertilizer and irrigation; limited or no

use of organic fertilizers; inappropriate agricultural practices; unstable tenure arrangements, and transboundary reasons upstream water withdrawal; and weather variability. The direct impacts of land degradation pose various degrees of challenges for different parts of the country. Some of these challenges are: loss of productivity and decreased production; food insecurity; adverse impact on socio-economic conditions and livelihood support systems; and increased poverty. Major environmental problems associated with land degradation include sediment transport and deposition downstream, on-site pollution from overuse and secondary effects of fertilizers and pesticides, off-site pollution of other ecosystems, of soil, water and air, deforestation, desertification, degradation of aquifers, salinization of soil, accumulation of toxic organic compounds, loss of biodiversity etc.

Degradation of Forests, Ecosystem and Biodiversity

The ecosystem in Bangladesh plays an important role in the country's ecology, environment, economy, and livelihood. But ecosystem habitats and wetlands biodiversity in Bangladesh have long faced serious degradation and loss due to many natural and anthropogenic factors. Besides natural causes, factors like overexploitation of resources, lack of property rights, human encroachment, conflicts over natural resource management, pollution, and conversion to other uses are some of the most important factors for the decline in ecosystem and biodiversity of the country. These natural resources need to be protected and conserved for maintaining the ecological balance, protect the environment and improve the livelihood of poor people.

Loss of forest land favoring crop/fisheries or industry, settlements, etc., mostly occurred in Madhupur tracts. Imbalanced felling (illegal felling) of trees and forest cover change from 2000 to 2010 is around 3000 km 2 (BBS). Top soil loss, landslides and increase in sediment load in rivers, burial by coarse sand on fertile lands of lower riparian, floods, river bank erosion, etc., are significant impacts of deforestation.

Earthquake

Bangladesh is located in the tectonically active Himalayan orogenic belt, developed due to the collision of the Indian, Arabian and Eurasian plates over the last 30-40 million years. As a result of these, the region is vulnerable to moderate to large earthquakes. Moreover, the country is surrounded by the Himalayan Arc, the Shillong Plateau, the Dauki fault system in the North, the Burmese Arc and Arakan Yoma Anticlinorium in the East and the East Naga Disang Haflong thrust zone in the North-East. The existence of an active fault has been proved in Haluaghat of Mymenshingh recently, adding further risk to the vulnerability.

The 1897 earthquake, known as the Great Indian Earthquake with a magnitude of 8.7, caused severe damage to buildings in Sylhet town with the death of 545 people, and heavy damage occurred to bridges on the Dhaka-Mymensingh railway. Rajshahi suffered severe shocks, and 15 people died. In Dhaka, property damage was severe. The 1918 earthquake, known as the Srimangal Earthquake, had a magnitude of 7.6 on the Richter scale. Its epicenter is located at Srimangal, Maulvi Bazar. The 1997 Chattogram (or Bandarban) earthquake occurred in the Bangladesh-India-Myanmar border region with Mw 6.1. Twenty-three people were killed due to a 5-storey building collapsed in Chittagong. The Borkol earthquake occurred in 2003 with a magnitude of Mw 5.7, killed three people, injured 25 and damaged about 500 buildings in Chattogram and the Chattogram Hill Tracts. From 2003 to 2017, 3 major earthquakes occurred in Nepal, India, Myanmar and Tripura. All of them were felt prominently in Bangladesh and several causalities occurred. The number of earthquakes has been increasing significantly over the last 20 years. Based on the record of the Geological Survey of Bangladesh, the country has experienced at least 465 earthquakes of minor-to-moderate magnitudes between 1971 and 2006 (Islam et al., 2016).

Moreover, Zaman and Monira (2017) reported 283 earthquakes as per the US Geological Survey (USGS) that were generated in Bangladesh or its very close regions during 1976-2016, among which 10% were of 3.0-3.9 scale, 77% of 4.0-4.9 scale, 12% of 5.0-5.9 scale and only 1% of 6.0-6.9 scale. Some of these had an epicenter within Bangladesh. The MRVAM study (2015) showed that major seismic risk comes from the Dauki fault that affects the nearby areas of Sylhet and Mymensingh. Bogra, Mymensingh, and Rangpur have the greatest seismic hazard in Bangladesh, and Dhaka is within the zone of impact for this. Overall, the consensus is that the rapid urbanization of Bangladesh has created a greater vulnerability to seismic events because urban planning and preparedness of the essential services have not been at par with the risks.

Landslides

Landslides are one of the major hazards in the hilly areas of Bangladesh. In recent years, the frequency of landslide disasters has been increased due to highly intensive rainfall and the concentration of population in hilly urban areas. In addition, other triggering factors include topography, weakening of slopes through saturation by water, loss of vegetation, steeping of the slope by erosion, properties of soil (sandy soil), and high-velocity surface run-off. Remarkably, the natural factors of landslides are more accelerated by human activities such as indiscriminately hill cutting for housing and brickfields, deforestation, lack of vegetation cover in hills, lack of appropriate laws, legislation and its implementation. In recent years, this has become a major concern in the Chattogram and Chattogram Hill Tracts. Chattogram suffered about 12 landslides (BWDB, 2005) during the last five decades. Around 17 people died in 1999, 13 in 2000, 91 in 2007, 54 in 2010, and 17 causalities occurred in 2011 due to the devastation of this disaster (BWDB, 2005). The death toll of the last three decades reached 200 deaths and a massive economic and property loss occurred. Landslides on 13 June 2018 in the Chattogram division have resulted in 160 deaths and 187 injured. 6,000 structures have been destroyed, and other key infrastructure damaged. Reports indicate that approximately 80,000 people are affected across five districts– Bandarban, Chattogram, Cox's Bazar, Khagrachari and Rangamati. Among these, 42,000 are considered severely impacted because their homes have been destroyed. Approximately 46% of the most affected settlements are in Rangamati, while 25% in Bandarban, 25% in Chattogram, 2% in Cox's Bazar and, 1% is in Khagrachari. The Sylhet division is also susceptible to landslides as this region has a high volume of rainfall, with intensity and frequency increases due to climate change. Soil erosion on the hills triggered by human interventions, like clearing vegetation coverage, can be the major cause of landslides in this region during highly intensive rainfall events. Historically, the landslides tendency has been increased in recent years after 2000. Around 19 landslides spots have been identified since 2008 in different areas of the Sylhet division, causing 33 fatalities and 13 injuries. According to BBS (2015), landslides caused around BDT 249.01 million damage and loss at households' level during 2009-2014.

River bank Erosion

Bangladesh is a riverine country. The morphology of the country's rivers is highly dynamic and river bank erosion is also a regular phenomenon, particularly along the banks of the main rivers. Based on CEGIS (2015) study, the present rate of bank erosion in the Jamuna, the Padma and the lower Meghna is about 1770, 1298 and 2900 ha per year, respectively. In 2008, erosion along the Jamuna, Ganges and Padma bank was 530, 880 and 535 ha, respectively, of which about 85, 75, and about 100 ha comprised settlements.

The Jamuna river has been widening at an average rate of about 130 m per year. This corresponded to a loss of about 70,000 ha in 23 years, while only 11,000 ha had been accreted. A major reason for the erosion is that the peak discharge in the rivers is increasing. Flow records over 50 years long for the station of Bahadurabad (Brahmaputra/Jamuna rivers) show that peak discharge is increasing and is occurring earlier. The average timing of the peak was in the middle of August but is now advanced in the first week of August. At Bhairab Bazar (Meghna), peak discharge is decreasing and its occurrence is delayed slightly. The time of peak has moved to the last week of September from mid-July in the late 1970s. At Hardinge Bridge (Ganges), peak discharge is increasing, but the peak time is advancing. The date is advancing by about one day in a decade. Suppose the present trend of advancing of the peak prevails. In that case, the chances of coincidence of Ganges and Brahmaputra peaks will be less, reducing the probability of catastrophic and long-duration floods. These changes are also impacting the river bank erosion patterns.

2.3. Climatic Hazard

Climate change is now considered one of the greatest challenges facing nations, regions, the global community and the integrity of planet earth itself. It is now scientifically proven that global warming is the direct result of massive and prolonged GHG emissions. This has led to global climatic disorder as natural disasters of various types occur more frequently and with increasing levels of devastation worldwide. Consequently, people's suffering has grown remarkably, especially in the Least Developed Countries (LDCs) and in Small Island Developing States (SIDS). Bangladesh, being low lying, a riverine country with a large population and long coastline, is one of the world's most vulnerable countries due to climate change.

Erratic Rainfall and Temperature Rise

In IPCC's Fifth Assessment Report (AR5), the globally averaged combined land and ocean surface temperature show 0.85°C warming during the past historical period (1880-2012). During the past measurement history, almost the entire globe has experienced surface warming. In addition to robust multi-decadal warming, global mean surface temperature exhibits substantial decadal and inter-annual variability.

Based on recent dynamic downscaling model results of CORDEX South Asia, the region-wise annual changes in temperature and rainfall during the 2050s and 2085s under moderate (RCP4.5) and extreme (RCP8.5) climate scenarios are prepared by CEGIS (2020) and presented in the following tables.

Table 2.2 : Projected annual surface warming (°C) in Maximum Temperature

	Base*(OC)	RCP4.5		RCP8.5	
Region	1971-2000	2050s	2085s	2050s	2085s
North West (NW)	30.4	1.0	1.3	1.3	2.3
North Central (NC)	30.3	1.0	1.2	1.2	2.1
North East (NE)	30.8	1.2	1.4	1.4	2.4
South West (SW)	30.0	1.2	1.4	1.4	2.3
South Central (SC)	30.0	1.2	1.4	1.4	2.3
South East (SE)	30.3	1.1	1.4	1.4	2.2
Eastern Hills (EH)	30.0	1.5	1.9	1.8	3.0
Bangladesh (BD)	31.3	1.2	1.5	1.5	2.5

**Country Average (Source: CEGIS, 2020)*

Table 2.3: Projected annual surface warming (°C) in Minimum Temperature

	Base*(OC)	RCP4.5		RCP8.5	
Region	1971-2000	2050s	2085s	2050s	2085s
North West (NW)	20.1	1.7	2.1	2.1	3.6
North Central (NC)	21.7	1.5	1.9	1.9	3.4
North East (NE)	21.6	1.7	2.2	2.1	3.9
South West (SW)	21.6	1.7	2.1	2.1	3.6
South Central (SC)	21.8	1.8	2.2	2.2	3.6
South East (SE)	21.0	1.6	2.0	2.0	3.5
Eastern Hills (EH)	19.7	1.6	2.1	2.1	3.8
Bangladesh (BD)	21.4	1.7	2.1	2.1	3.6

**Country Average (Source: CEGIS, 2020)*

Table 2.4: Projected annual change (%) in rainfall

	Base*(mm)	RCP4.5		RCP8.5	
Region	1971-2000	2050s	2085s	2050s	2085s
North West (NW)	1,873	10.2	6.9	11.0	15.7
North Central (NC)	2,079	4.0	2.7	3.5	10.1
North East (NE)	3,219	-7.5	-8.2	-7.4	-1.2
South West (SW)	1,691	4.1	3.0	6.3	13.7
South Central (SC)	2,314	-2.7	-4.0	-1.0	6.0
South East (SE)	2,576	-4.0	-5.1	-2.9	4.2
Eastern Hills (EH)	3,124	11.6	12.0	14.0	23.0
Bangladesh (BD)	2,406	1.7	2.1	2.1	3.6

**Country Average (Source: CEGIS, 2020)*

The table shows that both maximum and minimum temperatures will increase in all regions of Bangladesh in the future. The annual warming will be much higher near the end of the century, and some regions will face more intense changes during summer. The rainfall pattern is going to be more variable and erratic in the future. There is an indication that pre-monsoon and monsoon rainfall will increase. On an annual basis, the rain is expected to increase in most regions except NE, SC and SE. Under the extreme climate scenario, more erratic rainfall behavior and changes in rainfall amounts are expected as temperature rises. These basic changes in the climate in future will aggravate the climate influences, disasters and hazards.

Floods

Flood is a recurrent phenomenon in Bangladesh that occurs almost every year. Each year in Bangladesh, about 26,000 square kilometers (around 18% of the country) is flooded, which rises to 55 per cent to 67 per cent during severe and catastrophic flood events, respectively (MoWR, 2015). These flood events take a heavy toll on the people of Bangladesh, including death, loss of properties and livestock, loss of agricultural resources etc. A study of the historical flood events depicts that the estimated damage due to flood events of 1988, 1998, 2004, 2007 and 2017 were US$ 1.2, US$ 2.8, US$ 6.6, US$ 1 and US$ 0.9 billion, respectively. Apart from recurrent monsoon floods, a flash flood in the North-Eastern part and coastal flooding in the Southern part of the country are also a matter of concern. The ongoing flood of 2020 has been an alarming event for the country where around 5 million people were affected and 41 people lost their lives. In addition to that, the frequency and magnitude of flood events have also increased due to climate change. During 1960-1985, only 1 mega flood event occurred; 8 mega flood events took place in the last 35 years (1986-2020). On top of that, future climate change may incur additional 5%-10% flood inundation as the future rainfall increases and its distribution. Other man-made causes like the dam's construction in upper riparian countries, unplanned urbanization in illegally encroached floodplains, lack of combination of structural and non-structural measures etc., are aggravating the situation.

Flash Floods

Flash flood is the main disaster in the North-Eastern part (Haor area) which engulfs the primary production sector (e.g., agriculture), threatening the lives and livelihoods of the people. Excess rainfall in the hilly upstream regions (i.e. Cherrapunji) and subsequent runoff, sedimentation in the rivers, deforestation and hill cuts, landslide, unplanned road and water management infrastructures and the changed climatic condition effects the main reasons behind the devastating flash floods. The majority of the extreme flash flood events occur in later April-early May, but the situation worsens in case of an early flash flood event (March- early April), which coincides with the Boro harvesting period in that region. Flash flood events in 2006, 2007, 2010 and 2015 caused flooding of more than 15% of the lands at several Haor districts (CEGIS, 2017). But the most devastating early flash flood in the recent past was in early April of 2017, devastating roads and embankments, damaging the pre-mature Boro crops in six Haor districts worth 13,000 crores Taka; posing a threat to the overall food security of the country. The very recent flash floods of 2020 damaged crops were even more due to several events (5 times) of floods. According to a recent study by CEGIS (2017), although the flash flood trends were not significantly increased over the past thirteen years' time period in the NE Haor areas, the frequency of high magnitude extreme flood events has increased. An increase in pre-monsoon rainfall due to changing climatic conditions might be the possible reason for the increase in extreme and early flash flood events in the Haor region.

Drought

The droughts occurring in Bangladesh are not meteorological but merely agricultural droughts which could also be termed severe moisture stress. Bangladesh experienced severe droughts in 1951, 1957, 1961, 1972, 1976, 1979, 1989 and 1997. Most of these droughts primarily occurred in pre-monsoon and post-monsoon seasons, but in some extreme cases, the pre-monsoon drought extended to the monsoon season due to the delayed onset of monsoon rains. The dry zone in Bangladesh located along the country's Western border is most vulnerable to droughts, together with some adjoining parts of Bogra, Pabna and Faridpur. It includes the Barind Tract, especially the High Barind in the West; the Southern part of Old Himalayan Piedmont Plain; the high Western part of Ganges River Floodplain and the West part of Ganges Tidal Floodplain. The mean annual rainfall in the dry zone is around 1,250-1,750 mm, falling mainly during wet months of May/June to September/October (Ahmed and Suphachalasai, 2014). During drought events, serious disruption in agricultural production occurs,

posing a threat to the country's overall food security. Apart from that, ecological and land degradation, drying of rivers, scarcity of livestock foods also occur during drought events. On average, 2.32 m.ha/yr (Kharif seasons) and 1.2 m.ha/yr (Rabi season) agricultural lands are damaged during a typical drought event (CEGIS, 2013). Studies have found that, under a severe climate change scenario (with 60% moisture stress), the yield of Boro might reduce by 55-62%. Moisture stress might force farmers to reduce the area of Boro cultivation. In future, with increasing temperature and erratic rainfall patterns due to climate change, surface irrigation potential in drought-vulnerable areas would get limited and challenge the food self-sufficiency programs of the country.

Sea Level Rise

Sea level rise is one of the most prominent issues in the Bangladesh delta due to its complex geographical position. A recent study of DoE (2015) has found that the overall trend of sea level in the coastal area of Bangladesh is 6-20 mm/year, and this trend is much higher in the Chattogram coastal plain area than the Ganges and Meghna subzones. This uprising water level trend forms possibilities of increased intensity and extent of coastal flooding. Sea facing Coastal area is vulnerable to coastal flooding. Salinity intrusion, land degradation, severe water logging, crop damage, scarcity of drinking water etc., are the most disastrous effects of sea-level rise in the coastal belt. Although no significant changes have been found in the Eastern portion of the coastal area, analysis indicates that due to changed climatic conditions, flooding extent will increase up to 6% and 8% in the central part and up to 5% and 6% in the Western portion of the coastal region from the base (2005) following extreme scenario by 2050 and 2100 respectively. IPCC AR5 report (2013) predicts a sea-level rise between 0.2 to 1m for low to high emission scenarios in 2100 for the Bay of Bengal. Recent IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (2019) states that global mean sea level (GMSL) is rising, with acceleration in recent decades. This will cause increases in tropical cyclone winds and rainfall and increases in extreme waves, combined with relative sea-level rise, exacerbate extreme sea-level events and coastal hazards.

Salinity Intrusion

As a country with a significantly long coastline and climate change-induced sea-level rise, the adverse impacts of saltwater intrusion are substantial for Bangladesh. Salinity mainly affects land and water in the coastal areas, but with climate change, it is gradually extending towards inland water and soil. This scenario of gradual salinity intrusion into the coastal areas of Bangladesh is very threatening to the primary production system, coastal biodiversity and human health. The coastal area of Bangladesh covers about 20% of the country and more than 30% of the cultivable land. Of the 151 upazillas in 19 coastal districts, 93 upazilla under 18 districts are affected by soil salinity. Out of 2.86 Mha of coastal and offshore lands, about 1.056 Mha of lands are affected by different degrees of soil salinity. Historical soil salinity data from the Soil Resources Development Institute (SRDI) shows that the problem is already increasing and the severity of salinity is changing. It also shows that districts of Jashore, Magura, Narail, Faridpur, Gopalgonj and Jhalokati are recently salinized in the last 24 years. A study report (IWM & CEGIS, 2007) indicates that about 10% and 16% area of the coastal belt is under 1 and 5 ppt salinity, respectively and this area will increase up to 17.5% (1 ppt) and 24% (5 ppt) respectively by 2050 in extreme CC scenarios. So, there will be around a 7% increase in area under 5 ppt salinity levels. The salinity front will move further inland from the South of Bangladesh with SLR and it will be further aggravated if the fresh water flows from upstream declines. The recent IPCC special report (2019) also strengthened these future risks as the SLR projections are getting much higher.

Cyclones and Storm Surges

Nearly every year, cyclones hit the country's coastal region (especially low-lying areas). From the historical trend analysis, it is observed that a severe cyclone strikes the country on average in every three years. Besides low-lying topography and nearly sea-level geography of the coastal area; the wide, shallow continental shelf, re-curvature of tropical cyclones in the Bay of Bengal, triangular (funnel) shape at the head of the Bay of Bengal, high tidal range are the major reasons for this disproportionately large impact of cyclones occurring in the Bay of Bengal. According to 3rd national communication of Bangladesh to UNFCCC, altogether, 21 tropical cyclones (wind speed >117 km/hr) and severe cyclones (wind speed between 87 to 117 km/hr) struck the Bangladesh coast between 1960 and 2010. Of these, 33.33% happened in the pre-monsoon season, while the remaining 66.66% occurred in the post-monsoon season. Bangladesh has faced severe cyclone events, especially in the last two

decades, including Sidr, Fani, Mora, Aila, Rashmi, Roanu and others. This year, cyclone "Amphan" affected more than a million people in 26 districts (including the most severely affected districts of Satkhira, Bagerhat and Patuakhali). IFRC situation report published on Relief web (2020) summarizes that more than 26 people were killed; 55,667 houses, 149,000 ha agricultural lands, 1,80,500 hatcheries, a total of 150 km of embankments, 200 bridges and culverts, 100 km of roads were damaged, causing a total loss of BDT 11 billion.

Due to changed climatic conditions, storm surges are amplifying for most of the region of the coastal belt, but the Meghna-estuarine region faces the most surge amplifications (Ali. A, 1999). According to World Bank (2011), in extreme CC scenarios, the areas vulnerable to inundation depths more than 1m and 3m would be 14 and 69 per cent higher than the baseline scenario, respectively. A 10-year-return period cyclone in the extreme scenario will be more intense by 2050 and will cover 43% of the vulnerable area, 17% more than the current coverage.

Ocean Acidification

The ocean ecosystem is being hampered due to the slow onset impact of climate change in two ways. One is Ocean Acidification increasing the pH value of water in the Bay of Bengal. Another is Ocean Deoxygenation, which can be caused by increased runoff containing many nutrients from land and sewage pollution.

The average pH value of water in the Bay of Bengal was about 7.75, and the pH in the Bay of Bengal fell by 0.2 units between 2012 and 1994 (pH 7.95). According to Towhida et al., the pH level of Bay of Bangel water is decreasing at a rate of 0.08 per year, which is very alarming. A study by Hossain, M. Shahadat et al. indicates. At the same time, in the Bay of Bengal in recent years, the pH level hovered just above 7 in general, at least once between 2009 and 2010, it fell below pH 7, i.e., actually became slightly acidic. The lower pH (7.75) might have made the Mollusks vulnerable and fragile, evidenced by the presence of a lesser number of Mollusks compared to that of 5 to 6 years back (Rashid et al.).

Projections indicate increasing ocean acidification (fall in pH) over various concentration levels of atmospheric carbon. The expected pH levels of mean surface ocean are 8.1, 8.01, 7.94, 7.87, 7.8 and 7.7 for the respective CO_2 levels of 350, 450, 550, 650, 750 and 1000 ppm. As the average level of 400 ppm has already been crossed, that means under a largely ineffective effort[1] to curb global emission of GHGs, the pH level of just about 8 may perhaps be already reached. It may be noted that whatever the average pH level is, various regional seas may have different pH levels, with differences noted between warmer and cooler regions. Cooler waters absorb more CO_2 than warmer waters. Consequently, acidification and its impacts may be more pronounced in cooler regions.

Between 1997 and 2008 (when pH was found to be around 7.5 to 7.8), the species of coral in the northern Bay of Bengal fell from 66 to 40. During the period 2004-2008, a reduction in oyster spat settlements and growth were recorded. Further, "there were reports of 475 fin fish species in 1971; this fell to 185 for fin fish and shell fish by 1993; to 98 for fin fish along Naf river estuaries, and just 53 fin fish by 2013 (in Ganges Meghna estuaries)."

Ocean acidification, along with simultaneous or resulting bio-physical and chemical interactions and feedback phenomenon may impact oceanic organisms in multiple ways, including reduced calcification (lowering the capacity of shell-based organisms such as coral, shrimp and crustaceans in general); disruption of photosynthesis processes and primary production in phytoplankton which form the base of the aquatic food web; and likely genetic changes in microbes which could cause a further chain reaction of change in symbiotic relationships among organisms; changes in sensory behaviour in species and failure to detect predatory species[2] ; changes in reproductive behaviour; reduced juvenile survival and even extinction of some species.

2.4. Impacts and Vulnerabilities in ECC Sector

Bangladesh is one of the most vulnerable countries due to climate change. Climate change is projected to result in both increased minimum and maximum temperatures throughout the country. The recent nationwide climate change vulnerability assessed by the MoEFCC (2018) indicates that the North-West region, the central South-West, and areas adjacent to Dhaka city will experience high levels of heat stress, especially in 2085s (2077-99), while the rest of the country may face relatively moderate and low levels of heat stress. There seems to be a higher degree of variability (in exposure to extreme heat) between timelines and scenarios in the drought-prone (central North-Western) part of the country (MoEFCC, 2018). The maps indicate that Chattogram Hill Tract, coastal region and North-Wast hoar areas will likely have a lower level of vulnerability. These areas are covered by reserved forests and social forests that may provide canopy cover and offset the impacts of extreme heat. The urban heat island effect will exacerbate heat stress in rapidly urbanizing areas.

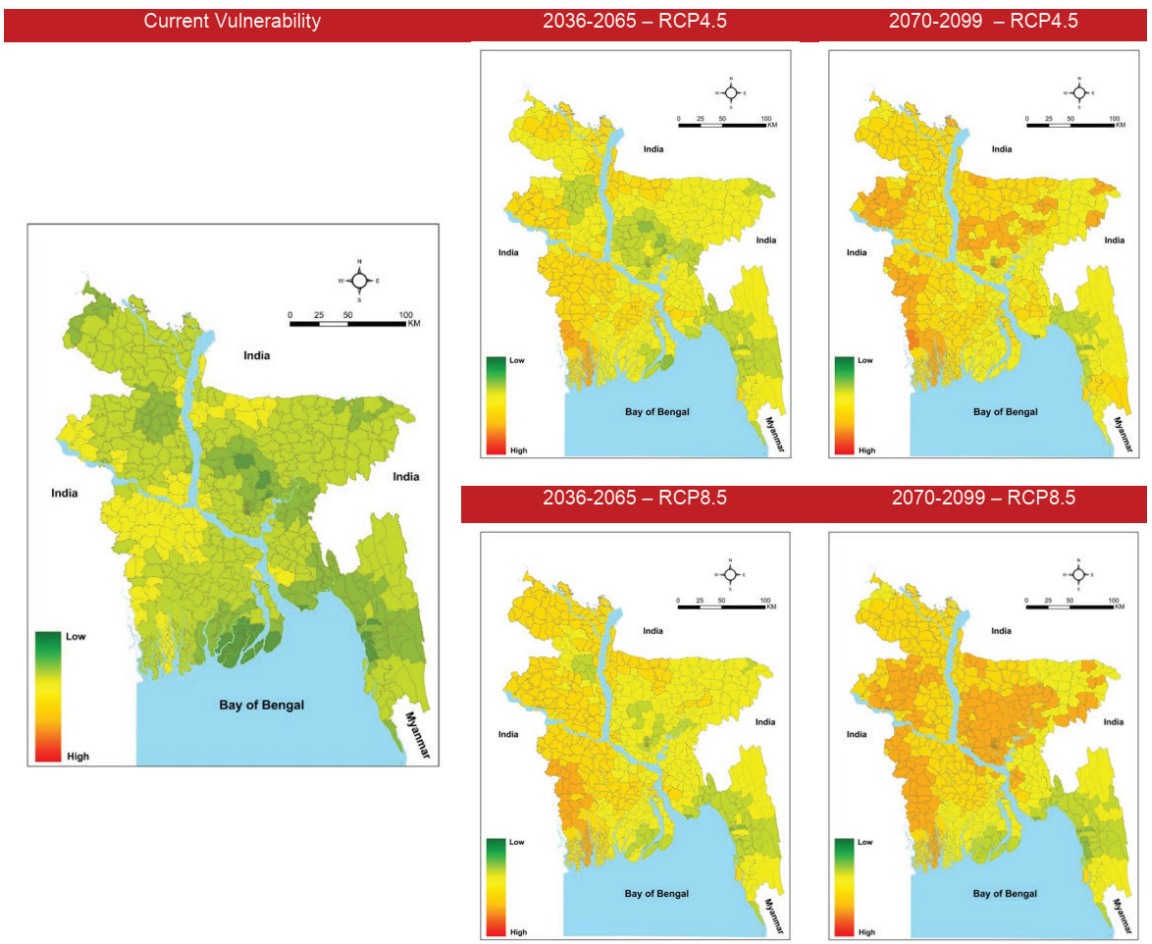


Figure 2.3: Human vulnerability to increased heat-stress for future (Source: NCVA study, 2018)

Almost all sectors in Bangladesh face the impacts of climate change, including induced floods, cyclones, salinity, droughts and other hazards. According to the recent IPCC report, in 2085s (2077-99), climate change will affect food security due to warming, changing precipitation patterns and greater frequency of extreme events worldwide. Due to droughts in the North Western part and salinity intrusion in coastal areas, Bangladesh will face drinking water security threats in the near future. Besides, direct damage of crops, a decrease of fresh water fish stocks, changes in fish physiology (growth of aquatic microphytes, reducing water productivity, habitat degradation and oxygen depletion) due to temperature and precipitation change will also increase the vulnerabilities. Albeit, expansion of aquacultures like crab and shrimp farming is favored by increasing salinity and habitat changes in the coastal region but scaling up such activities will need to be handled with precaution

due to potential environmental and diseases risks. There is robust evidence that agricultural pests and diseases have already responded to climate change, increasing and decreasing infestations. Growing heat and weather patterns have both direct and indirect impacts on livestock's as well. Mangrove ecosystems are highly susceptible to changes in salinity, temperature and rainfall. Due to climate change, experts predict that the species distribution of trees in the Sundarbans mangrove forest will be changed, which will impact the forest-dependent livelihoods.

High dependency of the poor and rural communities on the agricultural sector, inadequate infrastructures, socio economic status of a large part of the country and low-lying delta setting are the vulnerabilities of Bangladesh to climate change. Due to climate change, intensified cyclones and storm surges accelerate the rural-urban migration trend in Bangladesh, creating pressure in urban areas and changes in socio-economic structure in rural areas. These rural migration to urban cities is pushing agricultural lands, waterbodies, forests, wetlands and urban utility services (drinking water, sanitation facilities and drainage etc.), exceeding their provisional capacities. Women are highly vulnerable to climate change impacts in Bangladesh. Along with direct climate change impact, women are also vulnerable to indirect climate change impact.

Bangladesh has faced significant losses due to these climate change impacts and vulnerabilities. With per capita Gross National Income (GNI) USUS$ 1,610 in FY 2016-17 (BBS 2017), the economic losses due to climate change in Bangladesh over the past 40 years were at an estimated US$ 12 billion, depressing GDP annually by 0.5 to 1 per cent[3] . An ADB study (2014)[4] conducted an economy-wide climate change impact assessment based on the Integrated Assessment Models for the South Asia region. It shows that the average temperature could rise by 2°C (2050) and around 4°C (2100) due to climate change. This will cause significant damages and losses to the economy in future as well. Bangladesh would face an annual GDP loss of around 2% by 2050. There is a 10% chance that losses will be over 4%. In the long term, if no action is taken to adapt to or mitigate global climate change, the average total economic losses are projected to be 9.4% by 2100 (MoEFCC, 2018). The projected average losses do not include impacts of extreme events such as cyclones, storms, floods and droughts.

The environmental hazards present in Bangladesh are related to anthropogenic activities and in some ways, climate change. Some of these hazards, like soil and river bank erosion, landslides etc., are heavily influenced by changing temperature and rainfall patterns. Under climate change impacts, these hazards will also increase if no adaptation measures are taken. Besides, the major controlling factor of increased vulnerability due to these hazards is increased human settlement and economic activities being located in risk-prone areas. The other discussed environmental hazards are mostly created and increased through uncontrolled and unsustainable practices focusing on maximum benefit harnessing from economic activities while ignoring the environmental rules, regulations and sustainable practices. In future, these consequences will further increase if the current situation and practices prevail. But the government is already tightening grip on these type of issues and focusing on sustainable and eco-friendly practices. This will ensure better situations in the future.

CHAPTER 3

Achievements and Targets

3.1. National Policy Frame for ECC: Window of Achievements and Targets

Bangladesh Government has prepared several policies and plans reflecting different aspects and issues of the country and many of them have also directly or indirectly addressed the ECC sector. These policy and planning initiatives at different times facilitated the achievement of landmark achievements in the ECC sector. The following table illustrates the national policy frame relevant to the ECC sector:

Table 3.1: List of key policy and planning documents relevant to the sector ECC

Key Thematic Areas	Legislations	Policies	Strategies and Plans
T1: Local Level Climate Change Adaptation and Resilient Infrastructures	• The Sustainable and Renewable Energy Development Authority (SREDA) Act, 2012 • Bangladesh Energy and Power Research Council (EPRC) Act, 2015 • Disaster Management Act, 2012 • Standing Orders on Disaster, 2019 • Disaster Management (Committee Structure and Functions) Rules, 2015 • (Draft) Disaster Management Fund Rules, 2015 • Bangladesh Climate Change Trust Act, 2010 • Bangladesh Oceanographic Research Institute Act, 2015 • Bangladesh Bridges Authority Act, 2016 • Bus Rapid Transit (BRT) Act, 2016 • Bangladesh Water Act, 2013	• National Co-operative Policy, 2012 • National Women Development Policy, 2011 • Nationally Determined Contributions (NDC) 2015 • Renewable Energy Policy of Bangladesh, 2008 • National Disaster Management Policy, 2015 • Cyclone Shelter Construction, Maintenance and Management Policy, 2011 • Coastal Zone Policy (CZP), 2005	• Perspective Plan of Bangladesh: Vision 2041 • Perspective Plan of Bangladesh: Vision 2021 • 7th Five Year Plan • 8th Five Year Plan • Bangladesh Delta Plan 2100 • Bangladesh Climate Change and Gender Action Plan (CCGAP) • Bangladesh Country Investment Plan for Environment, Forestry and Climate Change (BCIPEFCC) 2016-2020 • National Social Security Strategy (NSSS), 2015 • National Sustainable Development Strategy (NSDS), 2013 • National Adaptation Programmes of Action (NAPA) 2005 • Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009 • Bangladesh Climate Fiscal Framework, 2014

Key Thematic Areas	Legislations	Policies	Strategies and Plans
			• Energy Efficiency and Conservation Plan Up to 2030, 2016 • National Plan for Disaster Management 2010-15; • (Draft) National Plan for Disaster Management (2016-2020); • (Draft) Plan of Action to Implement Sendai Framework for Disaster Risk Reduction, 2015-2030 • Plan of Action on Disaster and Climate Risk Management in Agriculture for Department of Agricultural Extension, 2015 • Nationally Determined Contributions (NDC), 2015 • Interim Updated Nationally Determined Contribution (2020) • Roadmap and Action Plan for Implementing Bangladesh NDC (Transport, Power and Industry Sectors), 2018 • Mujib Climate Prosperity Plan • Railway Master Plan • Road Master Plan • Integrated Coastal Zone Management Plan • National Adaptation Plan
T2: Green Growth and Low Carbon Development	• Bangladesh Industrial Design Act, 2016 • Bangladesh Climate Change Trust Act, 2010 • National Land Transport Policy, 2004 • Integrated Multi-Modal Transport Policy, 2008 • Bus Rapid Transit (BRT) Act, 2016 • Industrial Policy • Power & Energy Fast Supply Enhancement (Special Provision) (Amendment) Act,2018	• Health Policy, 2011 • National Nutrition Policy, 2015 • National Industrial Policy, 2016 • National Education Policy, 2010 • National Tourism Policy, 2010 • Green Banking Policy of Bangladesh Bank • Policies for setting up and operating bioethanol plants,2017 • LP Gas Operational Licensing Policy,2017	• Perspective Plan of Bangladesh: Vision 2041 • Perspective Plan of Bangladesh 2010-2021 • 7th Five Year Plan (2016-2020) • 8th Five Year Plan • The National Sustainable Development Strategy, 2010-2021 (NSDS) • BDP 2100 • Bangladesh Environment, Forestry and Climate Change Country Investment Plan (BCIPEFCC)

Key Thematic Areas	Legislations	Policies	Strategies and Plans
		• Private Sector LNG Installation, Import and Supply Policy, 2019	• Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009 • Bangladesh National Action Plan for Reducing Short-Lived Climate Pollutants (SLCPs) • Mujib Climate Prosperity Plan • Road Master Plan • National Adaptation Plan
T3: Urban Environment Management	• Urban and Regional Planning Act, 2017		• Perspective Plan of Bangladesh: Vision 2041 • 7th Five Year Plan • 8th Five Year Plan • Bangladesh Delta Plan 2100 • The National Sustainable Development Strategy, 2010-2021 (NSDS) • Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009 • Bangladesh National Conservation Strategy • Mujib Climate Prosperity Plan • Road Master Plan • City/Municipality Development Plan • Structure Plan • Detailed Area Plan • National Adaptation Plan
T4: Pollution Control	• Bangladesh Environment Court Act, 2010 • Bangladesh Biosafety Rules, 2012 • Brick Manufacturing and Brick Kilns Establishment (Control) Act, 2013 • The Ship Breaking and Recycling Rules, 2011 • Bangladesh Environment Conservation Act (1995) • Environment Conservation Rules (1997)	• National Environmental Policy, 2018 • Hazardous Waste and Ship Breaking Waste Management Regulations, 2011	• Perspective Plan 2021 • Perspective Plan of Bangladesh: Vision 2041 • 7th Five Year Plan (2016-2020) • 8th Five Year Plan • Bangladesh Delta Plan 2100 • Bangladesh Environment, Forestry and Climate Change Country Investment Plan (BCIPEFCC) • Bangladesh National Action Plan for Reducing Short-Lived Climate Pollutants (SLCPs) • Mujib Climate Prosperity Plan

Key Thematic Areas	Legislations	Policies	Strategies and Plans
T5: Blue Economy	• Bangladesh Water Act, 2013 • The National River Protection Commission Act, 2013 • Bangladesh Oceanographic Research Institute Act, 2015 Marine Fisheries Act 2020 • Marine Protected Area (MPA) in 2019' through S.R.O No. 211-Law/2019; • Bangladesh Water Rule, 2018	• National Water Policy (NWPo), 1999 • Integrated Small Scale Irrigation Policy, 2014 • Public Water body Management Policy, 2009 • Coastal Zone Policy (CZP), 2005 • National Fisheries Policy 1998; • National Shrimp Policy 2014; • Jal mahal Policy, 2009	• Perspective Plan 2021 • Perspective Plan of Bangladesh: Vision 2041 • 7th Five Year Plan (2016-2020) • 8th Five Year Plan • Master Plan of Haor Areas, 2012 • Bangladesh Delta Plan 2100 • Bangladesh Environment, Forestry and Climate Change Country Investment Plan (BCIPEFCC) • Coastal Development Strategy, 2006 • Mujib Climate Prosperity Plan • National Adaptation Plan
T6: Forests, Ecosystem and Biodiversity	• RAMSAR Convention • Forest Act 1927 • Wildlife (Preservation & Security) Act, 2012 • Biodiversity Act, 2017 • Sand Quarry and Earth Management Act, 2010 • Urban and Regional Planning Act, 2017 • Ecological Critical Area Management Rules, 2016 • Natural Water Body Protection and Preservation of Open Spaces and Playground Act, 2000 • Chattogram Hill Tracts Regulation Act, 1990 • Fisheries Hatchery Act 2010; • Fisheries Hatchery Rules 2011; • Marine Protected Area (MPA) in 2019, through S.R.O No. 211-Law/2019; • The Protection and Conservation of Fish (Amendment) Act, 2002 • Bangladesh Water Act, 2013	• National Forestry Policy 2017 • Coastal Zone Policy (CZP), 2005 • Public Water body Management Policy, 2009	• Perspective Plan 2021 • Perspective Plan of Bangladesh: Vision 2041 • 7th Five Year Plan (2016-2020) • 8th Five year Plan • Bangladesh Environment, Forestry and Climate Change Country Investment Plan(BCIPEFCC) • Bangladesh National Conservation Strategy (2016-2031) • National Biodiversity Strategy and Action Plan of Bangladesh 2016-2021 • National Sustainable Development Strategy (NSDS), 2013 • Coastal Development Strategy (CDS), 2006 • Master Plan for Agricultural Development in the Southern Region of Bangladesh, 2012 • Mujib Climate Prosperity Plan • Bangladesh Delta Plan 2100 • Integrated Coastal Zone Management Plan • Haor Master Plan • National Adaptation Plan

Key Thematic Areas	Legislations	Policies	Strategies and Plans
T7: Food Security, Social Protection and Health	• The Bangladesh Agricultural Research Council Act, 2012 • Bangladesh Agricultural Research Institute (BARI) Act, 2017 • Fisheries and Livestock Feed Act 2010 • Fisheries Feed Rules 2011 • Fisheries Quarantine Act 2018 • Fish and Fish Products (Inspection and Quality Control) Act-2020;	• Climate Resilient Crop Variety and Technology Development Policy, 2010 • National Agriculture policy 2018 • National Agriculture Extension Policy • National Food Policy	• Perspective Plan 2021 • Perspective Plan of Bangladesh: Vision 2041 • 7th Five Year Plan • 8th Five Year Plan • Bangladesh Delta Plan 2100 • Bangladesh Country Investment Plan for Environment, Forest and Climate Change (BCIPEFCC) • Master Plan for Agricultural Development in the Southern Region of Bangladesh, 2012 • Plan of Action for Implementation of Agriculture Policy, 2018 • National Strategy for Adolescent Health 2017-2030 • Mujib Climate Prosperity Plan • National Adaptation Plan • National Social security Strategy 2015
T8: Institutional Strengthening, Coordination and Governance	• Bangladesh Climate Change Trust Act, 2010 • Ecological Critical Area Management Rules, 2016 • Natural Water Body Protection and Preservation of Open Spaces and Playground Act, 2000 • Chattogram Hill Tracts Regulation Act, 1990	• Green Banking Policy of Bangladesh Bank • Coastal Zone Policy (CZP), 2005	• Perspective Plan 2021 • Perspective Plan of Bangladesh: Vision 2041 • Bangladesh Delta Plan 2100 • 7th Five Year Plan (FYP) 2016-2020 • 8th Five Year Plan • National Sustainable Development Strategy (NSDS), 2013 • Bangladesh Climate Fiscal Framework, 2014 • Bangladesh Environment, Forestry and Climate Change Country Investment Plan (BCIPEFCC) • Haor Master Plan, 2012 • Mujib Climate Prosperity Plan • National Adaptation Plan

Key Thematic Areas	Legislations	Policies	Strategies and Plans
T9: Research, Innovation and Capacity Development	• Bangladesh Institute of Research and Training on Applied Nutrition (BIRTAN) Act, 2012 • Bangladesh Oceanographic Research Institute Act, 2015 • The Bangladesh Agricultural Research Council Act, 2012 • Bangladesh Agricultural Research Institute (BARI) Act, 2017 • Bangladesh Fisheries Research Institute Act, 2018 • Bangladesh Livestock Research Act	• National ICT Policy, 2015 • Climate Resilient Crop Variety and Technology Development Policy, 2010 • Agricultural Research Vision 2030 • National Science and Technology Policy (NSTP), 2011 • National Biotechnology Policy, 2012 • Climate Resilient Crop Variety and Technology Development Policy, 2010	• Perspective Plan 2021 • Perspective Plan of Bangladesh: Vision 2041 • 7th Five Year Plan (2016-2020) • 8th Five Year Plan • Bangladesh Delta Plan 2100 • Bangladesh Environment, Forestry and Climate Change Country Investment Plan (BCIPEFCC) • National Science and Technology Policy (NSTP) 2011 Action Plan, 2012 • National Biotechnology Policy 2012 Action Plan, 2014 • Energy Efficiency and Conservation Plan Up to 2030, 2016 • Guidelines for Net Metering Policy in Bangladesh, 2018 • Mujib Climate Prosperity Plan • National Adaptation Plan

Table 3.2: Schematic representation of the national policy frame for sector ECC in Bangladesh

	Multi-sectoral with environment, forest and climate change related strategic objectives, goals and targets.	Climate change adaptation and mitigation	Forestry and biodiversity	Environmental management and pollution control	Other sectors with environment, forest and climate change related strategic objectives, goals and targets.
Umbrella document	Perspective Plan 2021-2041	Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009	National Forestry Policy 2017	National Environmental Policy 2018	National Water Policy (NWPo), 2018
	Perspective Plan 2010-21		Bangladesh National Conservation Strategy (2016-31)		Coastal Zone Policy (CZP), 2005
	Delta Plan 2100				National Disaster Management Policy (NDMP), 2015

	Multi-sectoral with environment, forest and climate change related strategic objectives, goals and targets.	Climate change adaptation and mitigation	Forestry and biodiversity	Environmental management and pollution control	Other sectors with environment, forest and climate change related strategic objectives, goals and targets.
Supplementary or Complimentary Plans / Action Plans thematic or sectoral focus	7th and 8th Five Year Plan	Bangladesh Climate Change and Gender Action Plan (BCCGAP) 2009	National Biodiversity Strategy and Action Plan 2016-21		National Agriculture Extension Policy (NAEP), 2015
	National Sustainable Development Strategy 2010-2021	Bangladesh Environment, Forestry and Climate Change Country Investment Plan (BCIPEFCC)	Master Plan of Haor Area (MPHA), 2012		
		National Adaptation Plan (NAP) (in the process)	The species-specific action plan, e.g. elephant, tiger, vulture, etc.		Coastal Development Strategy (CDS), 2006
	Nationally Determined Contributions 2015			National Plan for Disaster Management (NPDM), 2016-2020	
	Bangladesh National Action Plan for Reducing Short-Lived Climate Pollutants (SLCPs)			Plan of Action on Disaster and Climate Risk Management in Agriculture for Department of Agricultural Extension, 2015	
	Energy Efficiency and Conservation Plan Up to 2030, 2016			Climate Resilient Crop Variety and Technology Development Policy, 2010	
	Renewable Energy Policy of Bangladesh, 2008			Bangladesh Food security Country Investment Plan, 2011	
				Public Water body Management Policy, 2009	

3.2. Tracking Significant Achievements

Bangladesh has attained remarkable and exemplary achievements since 2008 to date, which is undoubtedly commendable to every global and national jury, especially in the Environment and Climate Change sector. The following sections summarize some of the major and significant achievements in the ECC sector which paved the way of achieving Vision 2021 and towards Vision 2041, making Bangladesh a role model around the world in resilient and sustainable climate change adaptation and mitigation, disaster management, climate-resilient development and sustainable environmental management.

Policy, Plan and Strategic Initiatives

Initiating the NAP Process

National Adaptation Plan (NAP) is a continuous, progressive and iterative process undertaken by developing country Parties to the UNFCCC. It enables Parties to identify medium and long-term adaptation needs and develop, implement strategies and programmes to address those needs. NAP follows a country-driven, gender-sensitive, participatory and fully transparent approach. Bangladesh has already initiated the NAP process with funding support from the GCF. The NAP process of Bangladesh has been initiated since UNFCCC (1992). However, some key milestones were achieved in 2005 by preparing the National Adaptation Programme of Action (NAPA).

Preparation of NAPA in 2005

To address immediate and urgent adaptation need to the adverse effect of climate change, the Ministry of Environment Forest and Climate Change, Government of Bangladesh, in response to UNFCCC, has prepared the National Adaptation Programme of Action in 2005, which includes noteworthy adaptation strategies, programmes, plans and has been updated in 2009. The updated National Adaptation Programme and Action has identified 38 adaptation measures, of which 16 (8 short term projects and 8 medium-term projects) have been under implementation by different ministries and departments. In the updated NAPA, identification of key adaptation needs has also been incorporated, including existing knowledge on cropping strategies, future strategies, mechanisms and possible adaptation measures.

Preparation of BCCSAP in 2009 and its Implementation

As Bangladesh Government is very much aware of the worst effect of climate change, the Government adopted the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2008. Bangladesh Climate Change Strategy and Action Plan, 2009 is the revised version of the initial document, which adds several new areas of action and climate investments in line with the priorities of the Government, including developing and harnessing the water resources through better river course management and river training helping in minimizing the destructive potentials of future floods that are expected to be more severe due to climate change, managing locational and involuntary displacement of people and their livelihood. BCCSAP was based on six thematic areas, which are 1) Food Security, Social Protection and Health, 2) Comprehensive Disaster Management, 3) Infrastructure, 4) Research and Knowledge Management, 5) Mitigation and Low Carbon Development and 6) Capacity Building and Institutional Strengthening.

The climate change relevant allocation in FY2019-20 has increased around 119 per cent in the development budget and around 69 per cent in the operating budget since FY2015-16 for implementation of BCCSAP. From FY2015-16 to FY2017-18, the average actual expenditure stood at around 85 per cent of the revised climate-relevant allocation. This reflects the Government's commitment to higher public investment in climate change-related activities. Among the thematic areas, the maximum allocation was made to Food Security, Social Security, and Health, followed by Infrastructure.

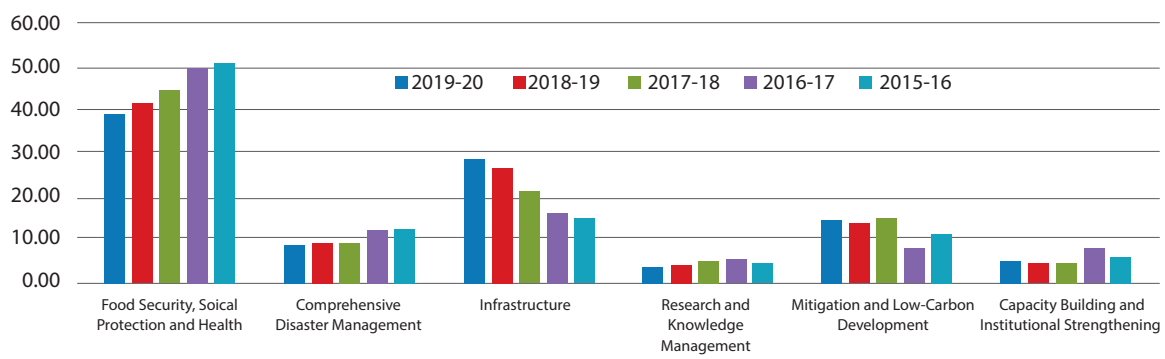


Figure 3.1: Budget Allocation Trend under BCCSAP Themes (Source: MoF, 2019)

It appears that out of total allocation, 7.81 per cent is climate change relevant as per climate sensitive budgeting approach set by Climate Fiscal Framework (2014). Out of the total climate change relevant allocation, the share of Food Security, Social Protection and Health is 38.89 per cent and that of Infrastructure is 28.61 per cent in FY2019-20. However, it appears that the CC appropriate allocation for Research and Knowledge Management and Capacity Building and Institutional Strengthening remain as low as 4 per cent and 5 per cent respectively.

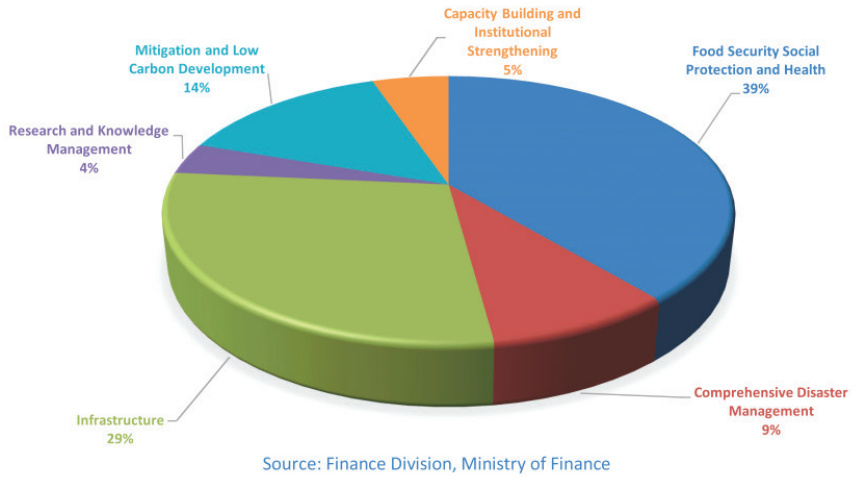


Figure 3.2: Distribution of allocated budget in CC related area (Source: MoF, 2019)

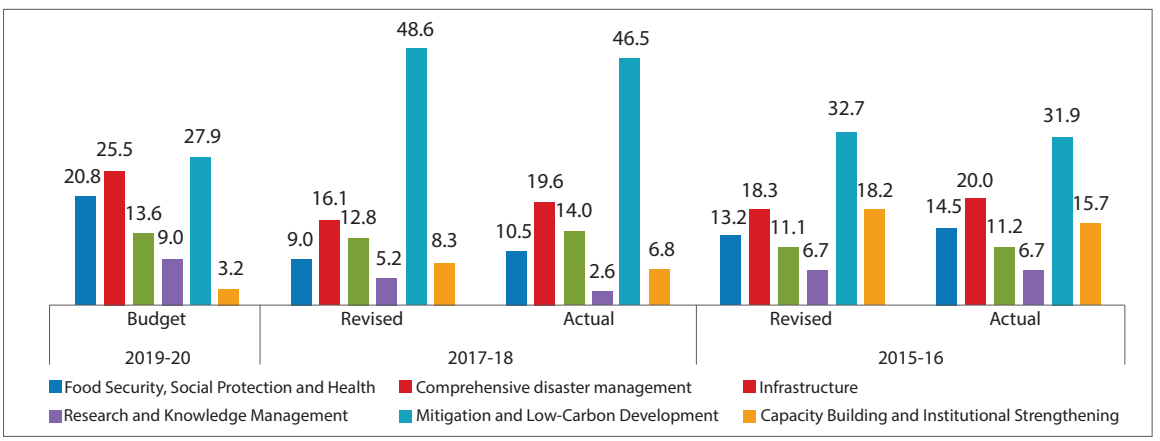


Figure 3.3: Allocation of Budget for MoEFCC under BCCSAP Themes (Source: MoF, 2019)

In FY2019-20, the BCCSAP thematic area on Mitigation and Low Carbon Development received the highest CC relevant allocation of 27.9 per cent. Allocation for Research and Knowledge Management had a significant rise from 6.7 per cent in FY2015- 16 to 9.0 per cent in FY2019-20. Actual expenditure is also shown in the above figure for FY2015-16 and FY2017-18 as well. This strategy and action plan are being now updated and in the process of finalization.

Preparation of Master Plan of Haor, 2012

To preserve, protect restore the ecosystem and protect the people of this area from natural disasters and improve the livelihood of poor people, the Bangladesh Haor and Wetland Development Board (BHWDB) has taken the initiative to prepare a comprehensive master plan. Agricultural development for food security, biodiversity enhancement and wetland management are some of the strategic thematic areas included in the Master Plan where agricultural development for food security thematic area encompasses crops, fisheries, pearl culture, and livestock sub-sectors to provide food security, economic development and poverty reduction of the haor people

and biodiversity enhancement and wetland management thematic area covers biodiversity and wetland and also the development of forest resources in the haor area.

Preparation of National Sustainable Development Strategy (2010-2021)

The National Sustainable Development Strategy (NSDS) has been prepared to meet the formidable environmental challenges that Bangladesh faces in development. It urges the proper recognition of consequential environmental impacts due to continuous development, which lead to degraded agro-ecosystem, rivers and wetlands, coastal environment and urban environment, degradation and depletion of ground water, deforestation and desertification in different parts of the country. The NSDS proposes strategies in priority sectors, i.e. agriculture, industry, energy, transport, and human resource development, which are key to the country's sustainable development.

Preparation of Climate Change and Gender Action Plan (ccGAP), 2013

The ccGAP integrates gender consideration into four of the six main pillars as identified in BCCSAP 1) Food security, social protection and health, 2) Comprehensive disaster management, 3) Infrastructure, 4) Mitigation and low carbon development. The ccGAP emphasis is integrating gender and climate concerns into policies and national documents concerning the agricultural sector through creating an environment to lease land/water bodies to women, ensuring crop insurance/or other safety nets for poor female farmers, access to financial instruments and involvement of women applying alternative technologies like bio fertilizer and climate-resilient cropping practices under the food security, social protection and health pillar. Development of a gender-responsive disaster management policy, increased participation of women in central and local disaster management councils (UDMC/ UzDMC), allocating financial resources to address gender and DRR issues, participation of women in community risk assessments, vulnerability and capacity assessment activities, as well as activities to help women and men to provide first aid and primary health care as first responders in an emergency are some initiatives considered in ccGAP under comprehensive disaster management pillar.

INDC Submitted to UNFCCC in 2015 and Interim Update in 2020

Nationally Determined Contribution (NDC) is an action under UNFCCC designated to combat climate change, especially for reducing greenhouse gas emissions by all country Parties. In its NDC, Bangladesh committed to reducing GHG emissions in the power, industry and transport sectors by 5 per cent below 'business-as-usual GHG emissions by 2030 using only domestic resources, or by 15 per cent below 'business-as-usual GHG emissions by 2030 if sufficient and appropriate support is received from developed countries. Bangladesh has prepared an implementation roadmap for the NDC to manage growing emissions without compromising the required development and allow the country to play its role in global efforts to limit temperature rise to two degrees or preferably 1.5 degrees above preindustrial levels. Bangladesh submitted its first INDC for the power, transport and industry sector in 2015.

Bangladesh has already implemented some key adaptation activities as urgent and immediate needs of the country. Implementation of identified adaptation measures is very critical to increasing the resilience of the country to climate change. For the effective implementation of NDC adaptation activities, it has been estimated that a total of TK. 3,52,800 crore is required during 2015-2030, which implies that TK. 23,520 crore is required annually. From FY2015-16 to FY 2020-21, 21.5 per cent (TK. 75,779.40 crore) of the required amount has been allocated in the budgets for implementing the programmes of the NDC adaptation portfolio. The table below shows the pattern of allocation for NDC adaptation programmes from FY2015-16 to FY2019-20. The second Nationally Determined Contribution is under preparation now and an interim report of updated NDC has been submitted to the UNFCCC on 31st December 2020.

Table 3.3: Investment in NDC Adaptation (Source: MoF, 2019)

(in crore K.)

NDC Adaptation Programmes	FRequired Finance 2015-30	Allocation in FY 2019-20	Allocation in FY 2018-19	Allocation in FY 2017-18	AlloCation in FY 2016-17	Allocation in FY 2015-16
Food security and livelihood and health protection (incl. water security)	67,200.00	5,026.56	4793.59	1231.16	3934.91	3513.23
Comprehensive disaster managemnt	84,000.00	4,746.79	4032.01	4397.89	3490.40	3231.16
Salinity intrusion and coastal protection	25,200.00	1,678.05	1599.70	1150.71	1097.68	765.86
River flood and erosion protection	50,400.00	1,150.61	996.48	106.01	331.19	256.07
Building climate resilient infrastructure	42,000.00	1,281.06	937.70	260.88	495.01	311.21
Rural electrification	25,200.00	959.11	244,56	142.41	169.47	245.46
Urban resilience	25,200.00	3,083.85	1370.54	1057.91	591.30	684.47
Ecosystem based adaptation (incl, forestry co-management)	21,000.00	1,265.32	931.10	660.30	652.20	519.61
Community based conservation of wetlands and coastal areas	8,400.00	1,745.59	1433.32	365.11	865.13	713.01
Policy and institutional capacity building	4,200.00	1,894.27	1536.60	1136.56	1647.39	1048.84
Total	**3,52,800.00**	**22,831.22**	**17,875.61**	**10,508.96**	**13,274.68**	**11,288.93**
% of total Requirement		**6.47**	**5.07**	**2.98**	**3.76**	**3.20**

Source: NDC Roadmap and Finance Division

For the effective implementation of NDC mitigation activities, it has been estimated that a total of TK. 2,26,800 crore is required during 2011-2030, which implies that TK. 11,340 crore is required annually. Since 2015-16, the government has allocated TK. 8,093.89 crore across various climate mitigation programmes. The highest allocation, TK. 5,661.58 crore has been made for improved energy efficiency during FY2015-16 to FY2019-20, while comparatively less allocation was made to renewable energy development (TK. 151.1 crore), lower emission from agricultural land (TK.6.17 crore) and management of urban waste (TK. 15.18 crore)

Table 3.4: Investment in Climate Mitigation (Source: MoF, 2019)

(in crore K.)

Climate Mitigation Programmes	Mitigation Related Bubget Allocation					
	FY2019-20	FY2018-19	FY2017-18	FY2016-17	FY2015-16	FY2015-16
Implementation of Specific low-carbon development related climate policies and strategies	11.78	10.00	8.00	7.28	4.80	1.52
Improved Energy efficiency	2,852.71	693.80	598.92	481.28	729.27	305.60
Gas Exploration and reservoir management	76.92	208.34	191.89	34.39	46.34	25.81
Development of coal mines and coal fired power station	84.16	85.43	84.64	103.26	35.84	6.71
Renewable energy development	66.88	15.51	21.78	29.53	12.09	5.31
Lower emission from agricultural land	1.62	1.65	0.95	0.87	0.56	0.52
Management of urban waste	2.01	7.24	1.33	4.58	0.01	0.01
Forestation and reforestation Program	217.69	96.80	126.42	107.76	68.01	59.12
Rapid expansion of energy saving Devices e.g. CFL	17.98	17.00	16.32	10.20	-	
Energy and water efficiency in built environment	31.32	116.39	92.29	53.04	55.48	44.37
Improving in energy consumption pattern in transport sector and options for mitigation	91.06	0.00	0.92	3.05	3.44	4.02
Total	**3,454.13**	**1,252.16**	**1,143.50**	**835.25**	**955.85**	**453.00**

Preparation of Bangladesh National Action Plan for Reducing Short-Lived Climate Pollutants (SLCPs), 2016

The first Bangladesh National Action Plan for Reducing Short-Lived Climate Pollutants has been prepared with an objective to revise and update the earlier NAP and also to identify and prioritize strategies that Bangladesh can undertake and implement up to the year 2040 and also has identified 16 key abatement measures, seven for reducing CH_4 from the major sources. The action plan includes replacing the traditional biomass cookstoves with improved biomass cookstoves, eliminate open burning of MSW by landfills/composting/recycling/anaerobic digestion, replacing the traditional brick kilns with improved brick kilns, replacing the traditional rice parboiling units with improved rice parboiling units, reduce open burning of crop residue, elimination of high-emitting vehicles, control of CH_4 emission from livestock by manure management and providing improved diet, establish/expand sewerage system and establish municipal wastewater treatment plant in major urban centers, promote intermittent aeration (AWD) of continuously flooded rice paddies, promote landfill methane gas collection with combustion or utilization, reduce leakage from the natural gas transmission and distribution system.

Preparation of Bangladesh Country Investment Plan for Environment, Forestry and Climate Change (2016-2021)

To increase the contribution of Environment, Forestry and Climate Change (EFCC) to the sustainable development of the country, thereby helping to reduce poverty, improve environmental and human health and increase resilience to climate change are the overall goal of the Bangladesh Country Investment Plan for Environment, Forestry and Climate Change which Ministry of Environment, Forest and Climate Change has prepared through a process of review, joint effort and consultation including multiple ministries, agencies, experts, NGO's and civil society organizations as well as various stakeholders at the divisional, district and community level. Through an extensive and inclusive process of stakeholder consultation and policy review, four investment pillars were identified to achieve BCIP EFCC. They were (a) Sustainable development and management of natural resources, (b) Environmental pollution reduction and control, (c) Adaptation and resilience to, and mitigation of climate change, and (d) Environmental governance, gender, human and industrial capacity development.

It is revealed in a critical review of the budgets for two environment-related Ministries, Ministry of Environment, Forest and Climate Change, Ministry of Power, Energy and Mineral Resources, that the allocation against CC relevance criteria constitutes approximately 95 per cent of the resources allocated for the implementation of BCIP EFCC programmes in FY2019-20.

For effective implementation of BCIP EFCC, it has been estimated that a total of TK. 98,108 crore is required during 2016-2021, meaning that TK. 19,622 crore is required annually. Since FY2016-17, 73.93 per cent (TK.72,533 crore) of the required amount has been allocated for carrying out the programmes of the BCIP EFCC. The table below shows the trend of budget allocations for programmes under BCIP EFCC during FY2016- 17 to FY2019-20.

Table 3.5: Budget allocations for different programmes under BCIP EFCC during FY2016- 17 to FY2019-20 (Source: MoF, 2019)

Source: BCCRF Annual Report 2016	Required Finance 2016-21	Allocation in FY2019-20	Allocation in FY2018-19	Allocation in FY2017-18	Allocation in FY2016-17
Pillar-1 : Sustainable development and management of natural resources					
1.1 Enhanced sustainable management of, and socioeconomic benefits from, forests	7434.00	1955.11	1521.20	1334.83	1001.97
1.2 Biodiversity conservation	4523.10	273.69	186.10	160.76	142.82
1.3 Sustainable management of wetlands, rivers and marine ecosystems	5822.04	4108.79	3783.89	3575.99	3178.98
1.4 Soil and groundwater management	2885.40	1597.91	1453.45	1398.39	1248.85
Sub-total	**20664.84**	**7935.50**	**6944.64**	**6469.97**	**5572.62**
Pillar-2: Environmental pollution reduction and control					
2.1 Reduced industrial pollution	5473.44		-	-	-
2.2 Reduced municipal and household pollution	24101.28		-	-	-
2.3 Reduced pollution from agriculture and others	1668.24		-	-	-
Sub-total	**31242.96**		**-**	**-**	**-**
Pillar-3: Adaptation and resilience to, and mitigate of, climate change					
3.1 Disaster risk reduction	13899.48	4822.47	4243.27	3474.31	3060.38
3.2 Sustainable infrastructure development	18500.16	3309.28	2696.84	1819.57	1273.95
3.3 Mitigation and low carbon development	6579.72	3232.55	1152.06	1014.44	725.08
3.4 Increased resilience at community level	2113.44	3379.23	2706.13	2353.62	2008.58
Sub-Total	**41092.80**	**14743.53**	**10798.30**	**8661.93**	**7067.99**
Pillar-4: Environmental governance, gender, and human and institutional capacity development					
4.1 Improved legislative, regulatory and policy framework	693.00	110.65	106.88	111.46	260.32
4.2 Improved stakeholder participation and gender equity in EFCC sectors	3498.60	341.91	329.09	409.27	380.23
4.3 Improved organizational capacity and process for evidence based decision making	915.60	630.05	569.85	569.34	520.27
Sub-total	**5107.20**	**1082.61**	**1005.81**	**1090.07**	**1160.82**
Total	**98107.8**	**23761.64**	**18748.76**	**166221.98**	**13801.43**

Development of Bangladesh Environmental Statistics Framework (2016-2030)

The Bangladesh Environmental Statistics Framework has been developed as a strategic guideline by Environment, Climate Change and Disaster Statistics Cell of Bangladesh Bureau of Statistics to provide a general understanding and guidelines on the importance of environmental resources, poverty and environment nexus and systematic data collection for Environmental Statistics to develop the compendium of environmental statistics, the environmental economic accounts as well as natural resource accounts like water, forest, land, energy, environment-poverty accounts, experimental eco-system accounts, fish, agriculture etc. The following

actions are planned to be executed through this framework, contributing a lot towards the knowledge generation and capacity building of relevant stakeholders for the ECC sector.

- Compendium of Bangladesh Environmental Statistics (Every two- or three-years reference period)
- Compilation of Resource Accounts (Land & Soil, Water, Forest, Agriculture, Energy, Natural Gas, Ecosystem Accounts) under the guidance of UN System of Environmental-Economic Accounting (SEEA) Central Framework
- Bangladesh Disaster-related Statistics: Climate Change and Natural Disaster Perspectives ((Every five years reference period)
- Compilation of Social Accounting Matrix (SAM)
- Poverty-Environmental Accounts (PEA) in light of SEEA in 2021
- Experimental Ecosystem Accounts (EEA) in light of SEEA CF
- Household Survey of Health and Sanitation in disaster-prone areas
- Urban/Rural (Household and Industrial) Waste and Water Management Survey
- Environmental Protection and Resource Management Expenditure Accounts
- Disaster Risk Reduction (Mitigation and Adaptation) Expenditure Account
- Climate Change and Natural Disaster Impacts Vulnerability Index
- Pre-crisis (Natural Disaster period) data gathering tools as a baseline information
- Climate and Natural disaster-induced Migration Statistics in Bangladesh
- Urban/Rural (Household, Industrial and Institutional), Water Generation, Use and Management Survey
- Developing a web-based data sharing, reporting and ensuring access for stakeholders

Formulation of National Disaster Management Plan (2016-2020)

Ministry of Disaster Management and Relief (MoDMR) has prepared the National Disaster Management Plan of Bangladesh (2016-2020) in line with the internationally acclaimed Sendai Framework for Disaster Risk Reduction (2015-2030).

Formulation of National Adaptation Plan

National Adaptation Plan is under preparation now by the Ministry of Environment, Forest and Climate Change. This plan will be the podium for adaptation actions for the country and a living document for adaptation goals in the global context. NAP is anticipated to be launched by 2022. The formulation of NAP focuses on a system based approach for planning analysis, covering multi-sectoral and thematic aspects like agriculture (crop, fisheries, livestock), water, forest and ecosystem, urban and coastal zone. This plan will include a set of climate actions to enhance the country's climate resilience, society and nature to be implemented by 2050.

Preparation of Bangladesh Delta Plan 2100

The government approved the 'Bangladesh Delta Plan 2100' (BDP 2100) in September 2018 as part of its efforts to secure the future of water resources and mitigate the likely effects of climate change, including natural disasters. It is a long-term integrated and holistic plan that takes a long-term view on water resource management, climate change and environmental challenges to support the long-term development of Bangladesh. The BDP 2100 aims to achieve three higher-level national goals together with six BDP specific goals. The Plan highlighted six hotspots, including coastal areas (27,738 square kilometres), Barind and drought-prone region (22,848 square kilometres), haor and flash flood-prone areas (16,574 square kilometres), CHT region (13,295 square kilometres), river region and estuaries (35,204 square kilometres) and urban region (19,823 square kilometres). Under the BDP 2100 Policy option, Bangladesh is estimated to achieve its GDP growth target of 8 per cent by 2020 and maintain an average expected growth rate to fulfil Vision 2041. A total of 80 projects have been selected for implementation under the investment plan in the first phase up to 2030. Of them, 65 would be infrastructure projects, while 15 would aim to enhance institutional capacity, efficiency and strengthen research.

Preparation of Mujib Climate Prosperity Plan 2030

Bangladesh is currently preparing and in the finalization process of the Mujib Climate Prosperity Plan, intending to pave a holistic pathway towards prosperity, highlighting Bangladesh as a global benchmark across the world. This plan is based on a transformative concept for sustainable economic growth investing in nature and climate resilience. Bangladesh has already planted 11.5 million trees to initiate a strategic, low carbon investment framework for growth and prosperity. This plan will be a significant step towards a green, nature-based and resilient recovery post-COVID-19 crisis impact.

Enhanced Climate Financing

Bangladesh Climate Change Resilience Fund (BCCRF)

To address the impacts of climate change, Bangladesh Climate Change Resilience Fund (BCCRF) is an innovative partnership between the Government of Bangladesh, Development Partners and the World Bank. Supporting the implementation of Bangladesh's Climate Change Strategy and Action Plan is the main objective of BCCRF and Bangladesh Government leads on the management and implementation of BCCRF. Bangladesh Climate Change Resilience Fund (BCCRF), owned and managed by Bangladesh, was established in May 2010. The Fund activities continued till 30th June 2017 since it came into operation. The governance structure of BCCRF included a Governing Council (GC) and a Management Committee (MC). The GC is comprised of a core group of government cabinet ministers, civil society and donor representatives providing overall strategic guidance to the BCCRF. The World Bank exercised internal controls over the guidance of trust funds received from BCCRF's development partners. Funds were allocated to projects and activities that were approved by the GC following BCCRF objectives. The investment projects of BCCRF collectively disbursed US$71.13 million by the end of December 2016. The following table presents the disbursement details of projects:

Table 3.6: Disbursement details of different projects through BCCRF (Source: MoF, 2019)

(US$million)

Sl . No	Project	Total Disbursement by December 31, 2016
1	Emergency 2007 Cyclone Recovery and Restoration Project (ECRF)	23.06
2	Secretariat forBCCRF	0.30
3	Community Climate Change Project	12.98
4	Climate Resilient Participatory Afforestation and Reforestation project (CRPARP)	29.89
5	Rural Electrification and Renewable Energy Development Project II(REDDII), Solar Irrigration Project	5.00
6		71.13
7	Total Disbursed by BCCRF Investment Project as of December 31, 2016	

Source: BCCRF Annual Report 2016

Bangladesh Climate Change Trust Fund (BCCTF)

Against the backdrop of the inadequacy of climate finance from multilateral and bilateral sources, the Government of Bangladesh created Bangladesh Climate Change Trust Fund (BCCTF) in 2009 from its revenue. It enacted Climate Change Trust Act 2010 to provide BCCTF with a legal footing. The BCCTF was created to combat climate change impacts and implement Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009, undertaking projects based on the thematic areas and programmes mentioned in BCCSAP.

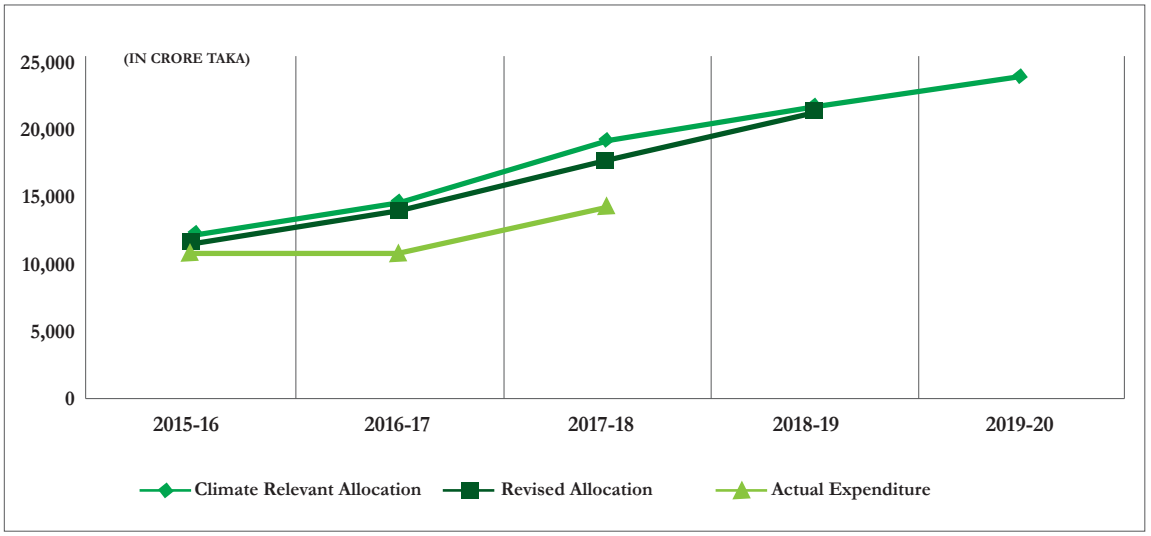


Figure 3.4: Trend of Climate Investment through BCCT (Source: MoF, 2019)

As of June 2020 (FY 2020-21), the Government has allocated nearly US$ 450 million to this fund since 2009. A total of 789 projects have been undertaken and 375 projects have been completed so far. The total CC relevant allocation shows an increase from FY2015-16 to FY2019-20 by 95.25 per cent. In FY2015-16, the CC relevant allocation was TK.12,163.36 crore in absolute terms and this was TK. 23,748.53 crore in FY2019-20, representing 0.7 per cent and 0.8 per cent of GDP, respectively.

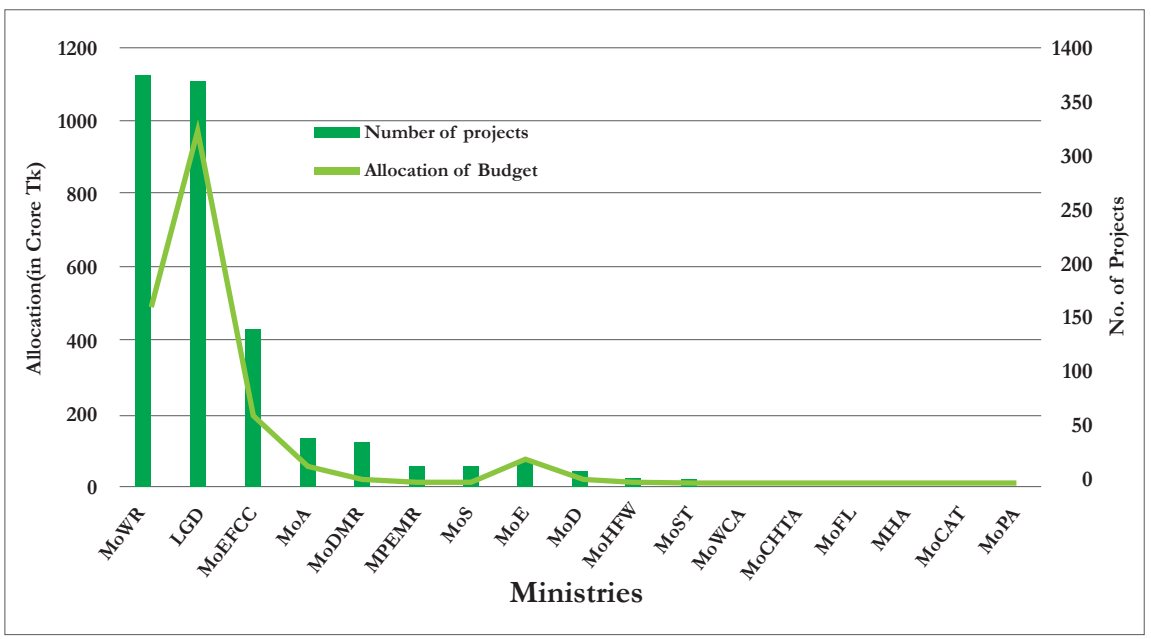


Figure 3.5: Budget allocation to different ministries (Source: MoF, 2019)

The figure above shows the allocation distribution per the BCCSAP thematic areas in FY2019-20 for twenty-five selected Ministries. Among the twenty-five Ministries, five top climate spending Ministries (Ministry of Environment, Forest and Climate Change; Ministry of Water Resources; Ministry of Agriculture, Ministry of Disaster and Relief; and Ministry of Fisheries and Livestock) allocated around 35 per cent of their total budget for climate change relevant activities.

Ministry of Water Resources received the highest allocation Tk. 1124.87 crore followed by Local Government Division and Ministry of Environment, Forest and Climate Change with an allocation of Tk. 1111.56 crore and Tk. 426.62 crore respectively among the Ministries/Divisions.

The importance of the Ministry of Environment, Forest and Climate Change in the battle against the adverse effect of climate change lies in its central role as the lead ministry for framing rules, regulations and policies relating to CC. Ensuring a habitable and sustainable environment for the present and future generations of the country is the mission of this ministry. The MoEFCC selected the following priority areas/programmes in the MBF in line with Medium-Term: Tackling the risks arising from climate change, Conservation and sustainable management of forest, Control of pollution and Conservation of bio-diversity.

Between FY2015-16 and FY2019-20, the trend of CC related allocation against the total budget of the Ministry of Environment, Forest and Climate Change (MoEFCC) increased significantly. In FY2015-16, the amount against the CC relevant allocation was TK.339.32 crore and in FY2019-20, it was TK.787.38 crore. CC-related activities received 52.62 percent of the overall budget in FY2019-20. The average real spending from FY2015-16 to FY2017-18 was roughly 90% of the revised climate-relevant allocation.

Allocation per division shows that the Barisal division ranks the topmost position regarding the number of projects and funding, followed by Chattogram and Dhaka division. In contrast, the Mymensingh division has received the smallest number of projects and allocation, 16 projects and a little more than Tk. 44 crore only.

Honorable Prime Minister Sheikh Hasina received the highest environmental award, "Champion of the Earth" in 2015 for the proven progressive and concentrated efforts for climate investments conducive to socio-economic development of the country through BCCTF. Besides, the Atomic Agriculture Research Institute won the environmental medal 2018 for the project titled "Innovation of Salinity Sustainable Crops", funded by the Trust Fund. Another project funded by Trust Fund and implemented by the Department of Agricultural Extension titled "Expansion of Floating Vegetable and Spice Production Technology as a Climate Change Adaptation Strategy in Flood and Water Logged Area" was recognized as a National Heritage Award in World Heritage by the Food and Agriculture Organization of the United Nations in 2015.

Green Climate Fund (GCF)

GCF is the largest source of climate finance globally which is governed by a 24-member board comprised equally of developed and developing countries, representing the United Nations Regional Groups. Bangladesh's country representative to GCF, known as the National Designated Authority (NDA), is the Economic Relations Division (ERD). Since ERD became the NDA of Bangladesh in November 2014, it has identified 6 potential National Implementing Entities (NIE). These are– Infrastructure Development Company Limited (IDCOL), PKSF, Department of Environment, Bangladesh Bank, Local Government and Engineering Department (LGED) and Bangladesh Climate Change Trust (BCCT). However, IDCOL and PKSF have got accredited by the GCF board. Bangladesh has received GCF Readiness support for strengthening NDA's Secretariat, preparing GCF country programme and accreditation GAP assessment for LGED- the prospective entity selected by ERD to get NIE accreditation support. The NDA secretariat has created a GCF country program and a substantial project pipeline, which would enhance Bangladesh's readiness to access and utilize GCF climate funds. Till June 2020, 4 climate change projects of Bangladesh received a grant amounting to US$94.7 million from GCF, and total 6 readiness activities have been approved for around US$4 million.

Adaptation Fund

The Adaptation Fund finances projects and programmes that help vulnerable communities in developing countries adapt to climate change. Initiatives are based on country needs, views and priorities. The Adaptation Fund was established to finance concrete adaptation projects and programmes in developing countries that are parties to the Kyoto Protocol and are particularly vulnerable to the adverse effects of climate change. Since 2010, the Adaptation Fund has committed more than US$ 830 million for climate change adaptation, resilience projects and programmes, including more than 120 concrete, localized projects in the most vulnerable communities of developing countries around the world with 28 million total beneficiaries. It also pioneered Direct Access, empowering governments to access funding and develop projects directly through accredited

national implementing entities. The Adaptation Fund, for the first time, has approved US$10 million for a project in Bangladesh, aiming to enhance the resilience of vulnerable communities of small islands and riverine Charland islands. The project titled "Adaptation Initiative for Climate Vulnerable Offshore Small Island and Riverine Charland in Bangladesh" is jointly being implemented by the Ministry of Environment, Forest and Climate Change (MoEFCC) and the United Nations Development Programme (UNDP).

Programmes or Initiatives for Environment, Forest, Ecosystem and Biodiversity Management

Achievements on Waste Management and Pollution Control

From June 2014 to 2018, the Department of Environment, in favor of a total 368 liquid waste disposal company has approved Zero Discharge Plan and already 3 companies among them, have successfully implemented the plan. The remaining companies are in the process of successful implementation of the programme. The Department of Environment forces industrial companies and projects to adopt environmental passes to control industrial pollution. To save the Buriganga River pollution from tannery originated wastes, the tanneries have been shifted to Savar from Hazaribag, setting the first example of relocating an entire industrial unit to save a river from industrial pollution.

Bangladesh Biodiversity Act 2017 has been enforced and made effective since 30 November 2017 to preserve biodiversity and ensure sustainable use. For biosafety in the country, the Department of Environment has established a sophisticated GMO Dictation Lab and a Web-Based Networking System to establish an internal network among the scientists, researchers, related government officials and research institutions doing research and activities in the biotechnology arena.

Sustainable Forests and Livelihoods (SUFAL) Project

SUFAL Innovation Grant (SIG) programme is a funding opportunity under the Sustainable Forests and Livelihoods (SUFAL) project. Its unique arrangement provides funding opportunities for conducting scientific and technological research on forestry for individuals and institutions. The overall goal of the SUFAL innovation fund is to provide resource support to researchers and academicians of public and private institutions, national and local organizations to strengthen institutions, private companies and information systems. It also includes training that facilitates the improvement of collaborative forest resource conservation and management in Bangladesh.

SIG also gives priority to SUFAL innovation theme: Climate change impact on forest and biodiversity conservation, livelihood diversification leading to reduced dependency on forest ecosystems and Public-Private Partnership is one of the potential areas of intervention that could be funded SIG which will promote Public-Private Partnership in context of forest biodiversity conservation, appropriate business model developing market linkage and value chain to strengthen access to market for the local community, capacity building of local communities especially women and youth through training.

Achievements under Bangladesh Tiger Action Plan

Bangladesh Government has been given the highest priority in conserving natural resources, including its wildlife, by the 15th Amendment (in 2012) of her constitution under "Protection and improvement of environment and biodiversity".

The Tiger Caravan (a caravan mimicking the tiger with a team of young people performing awareness programmes in different areas) of USAID- funded Bagh Project of the Wild Team was very successful in awareness-raising for tiger conservation. From 2010, following the St. Petersburg Declaration, Bangladesh nationally celebrates the Global Tiger Day annually on 29 July, organized by BFD has significantly contributed to awareness-raising at the national and local levels. In 2011, a tiger was successfully tranquillized in the forest-village boundary of Satkhira Range, which was transported and released to the deeper part of the forest named Dobeki.

In 2012, a stray tiger with one leg missing was tranquillized in the forest-village boundary of Khulna Range and was sent to Bangabandhu Sheikh Mujib Safari Park in Gazipur, where it is living in captivity. In 2015, the BFD published its first-ever estimate of tiger population (total 106 tigers in Bangladesh Sundarbans) based on a rigorous scientific study using the camera traps. The Tiger Range Countries (TRCs) appreciate the commitment of the Government of Bangladesh under the dynamic leadership of the Honorable Prime Minister Sheikh Hasina in tiger conservation and also invite the Honorable Prime Minister to continue her stewardship of the St. Petersburg Declaration.

Special Awards for Significant Achievements on Forest, Ecosystem and Biodiversity Management

The 'Community-Based Adaptation to Climate Change' project implemented by the Ministry of Environment, Forests and Climate Change in the coastal areas has received the 'Runner Up' award for the 'Solution Search: Adapting to a Climate Change' competition.

The Chunti Wildlife Sanctuary Co-Management Committee has won the UN-announced Equator Award 2012.

To conserve Cox's Bazar Teknaf Wildlife Biodiversity and have a special contribution in motivating local men and women to stop illegal tree trafficking, the widow of Kerantali village of Teknaf Upazilla has won the Wangari Mathai Award 2012.

Fisheries and fruit farming methods jointly with afforestation under the project 'Community Based Adaptation to Climate Change' implemented by the MoEFCC has won the international 'Earth Care' award.

The Tangail Forest Department received the Climate Award 2012 for forest protection by rehabilitating 700 families through the Modhupur Forest.

Participation and livelihood opportunities for local people through dyke afforestation in Char Kukri-Mukri, Bhola District under the project 'Community Based Adaptation to Climate Change' implemented in the coastal area has been recognized by the United Nations as the best project in 2012.

Community-Based Ecosystem Conservation and Adaptation in Ecologically Critical Areas of Bangladesh

The Bangladesh environment Act, 1995, authorizes the Ministry of Environment, Forest and Climate Change to declare an Ecologically Critical Area (ECA). The DoE implemented "Coastal and Wetland Biodiversity Management Project (CWBMP)", funded by UNDP-GEF and the "Community Based Adaptation in Ecologically Critical Area" CBA-ECA Project (2011-2015) funded by the Bangladesh Climate Change Trust, the embassy of the Kingdom of the Netherlands in Dhaka and the UNDP.

At the eco-system and species levels, the CBA-ECA Project undertook many conservation initiatives ranging from mangrove restoration and sea turtle conservation on the coast to swamp protection and aquatic sanctuaries in the haor. Special initiatives were undertaken by providing a wide range of technological support like improved cooking stoves, solar home systems, solar irrigation, desalination plants and submersible green belt to build community resilience through adaptation and mitigation. Women's empowerment is also enhanced through alternative income generation activities, capacity and skill development training. The project has constructed four watchtowers, popularly known as Paribesh Tower, to encourage ecotourism and better surveillance of ECA resources.

3.3. National Goals & Targets aligned with ECC

Bangladesh has been engaged in the incorporation and implementation of several international policy provisions. It plans to address relevant national issues, facilitate achieving national objectives and boost the reputation of Bangladesh against other countries by attaining benchmarks or priorities. Thereby it would increase the global ratings of Bangladesh.

Therefore, the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs) are key elements of the development policy frame of the country. As the country holds the reputation of achieving Millennium Development Goals (MDGs), which was targeted to achieve by 2015, the government is highly committed to achieving the SDGs by 2030. In 2009, the latest policy document of the government to address both adaptation and mitigation titled "The Bangladesh Climate Change Strategy and Action Plan (BCCSAP)"

was developed, recognizing all the climate-induced hazards and their associated impacts on different sectors. The document suggested 10 years of active measures to face challenges and changing conditions. After that, in 2010, the Perspective Plan (2010-2021) with three fundamental principles of promoting democratic institutions, promoting gender balance and achieving middle-income country status was derived from the political agenda, namely, "Vision 2021" of the current government of Bangladesh. Two consecutive five-year plans, i.e. 6FYPs (2010-15) and 7FYPs (2016-20), formulated the specific strategies and tasks of implementing the broad framework provided by the 2010-21 Perspective Plan. The 7FYP reflects a continuation of the major goals articulated in the 6FYP. The first year of the 7th Plan also coincides with the UN post- 2015 Sustainable Development Goals (SDGs) launch.

During the same time, Bangladesh developed its Intended Nationally Determined Contributions (INDC) under the auspices of the MoEFCC (in 2015). Following the Paris Agreement, the NDC was scoped with farming mitigation actions to tackle its growing emissions and play its role in global efforts to limit temperature rise to two degrees or preferably 1.5 degrees above pre-industrial levels.

The Bangladesh Country Investment Plan for Environment, Forestry and Climate Change (BCIP EFCC) framework was developed for 2016-2020 to increase the contribution of EFCC sectors to the country's sustainable development through the enhanced provision of ecosystem services. In 2017, the SDG Action plan was developed to achieve the goals and targets of SDG. With this continuation, Bangladesh's National Action Plan on Short-Lived Climate Pollutants (SLCPs) was developed in 2018 to identify and implement the most cost-effective pathways for the large-scale implementation of SLCP mitigation measures. With this regard 11 priority mitigation measures were included in Bangladesh's National SLCP Plan, six of which target major black carbon sources and five of which target major methane sources. Bangladesh Delta Plan 2100 is currently considered as one of the major planning documents of the country considering several possible future development pathways against projected scenarios and allows flexibility in planning development programmes in light of the changing climate, new knowledge or changing policy priority and it is targeted to reduce long term vulnerability from water and climate change-related hazards and to ensure environmental conservation. Finally, the Government adopted the Perspective Plan 2021-2041 as a continuation of Vision 2021. The plan seeks to take the nation to the development path dreamt by the Father of the Nation, Bangabandhu Sheikh Mujibur Rahman and eliminate extreme poverty and reach Upper Middle-Income Country (UMIC) status 2031 and High-Income Country (HIC) status by 2041, with poverty approaching extinction.

The national goals and targets outlined in the chronology of Bangladesh's planning and development process were flexibly adopted to achieve a set vision as the ultimate target. However, the goals and targets in different planning documents have been fixed from different perspectives. The following sections thus portray the national goals and targets relevant to ECC:

Targets of BCCSAP

This Climate Change Strategic Action Plan comprises immediate, short, medium and long term programmes and is built on six pillars 1) Food security, social protection and health, 2) Comprehensive disaster management, 3) Infrastructure, 4) Research and Knowledge management, 5) Mitigation and low carbon development and 6) Institutional capacity building, under which specific targets have been set to reduce climate change vulnerabilities for the country. They are as following:

- Build the institutional capacity and research towards climate-resilient cultivators and their dissemination.
- Development of climate-resilient cropping systems, appropriate to different agro-climatic regions.
- Develop drought management options for farmers.
- Development of adaptation strategies in the fisheries sector.
- Development of options for adaptation in the livestock sector.
- Ensure adequate water supply and improved sanitation.
- Livelihood protection in ecologically fragile areas.
- Improvement of the existing flood forecasting and early warning systems by increasing lead times and strengthen dissemination mechanism.

- Improvement in cyclone and storm surge warnings and dissemination.
- Community based disaster preparedness and improved resilience.
- Ensure continued flood protection by repairing and rehabilitating existing flood embankments.
- Make existing cyclone shelter safe and functional.
- Repair and reconstruct the existing polders in the coastal belt of Bangladesh.
- Prevent drainage congestion and water logging that may result from heavy rainfall in urban areas.
- Revive the network of rivers and khals.
- Monitoring and modelling to predict the sea-level rise and its impacts.
- Identify macroeconomic and sectoral effects of climate change.
- Adaptation to climate change in the tourism sector.
- Ensure energy security and low carbon development of the economy.
- Enhance energy security and ensure low emission development.
- Lower emission from agricultural land.
- Ensure livable cities while lowering GHG emissions.
- Scale-up afforestation and reforestation.

Targets of Intended Nationally Determined Contribution

INDC, 2015 was the first initiative by Bangladesh to counter climate change as a contribution to the global mitigation efforts where the following specific targets were set:

- An unconditional contribution to reduce GHG emissions by 5% from Business as Usual (BAU) level by 2030 in the power, transport and industry sector based on existing resources.
- A conditional 15% reduction in GHG emissions from BAU levels by 2030 in the power, transport, and industry sectors is subject to appropriate international support in finance, investment, technology development, transfer and capacity building.

Bangladesh has formulated Roadmap and Action Plan for Implementing Bangladesh NDC (Transport, Power and Industry Sectors) in 2018. NDC review and update is in progress. Bangladesh has already submitted Updated NDC (Interim) to the UNFCCC on 31 December 2020. It will submit the final report by mid-2021, where the updated targets for a national contribution towards reducing GHG emissions will be outlined.

Implementation of BCIP EFCC (2016-2020)

The BCIP EFCC provides a five-year (2016 – 2021) strategic framework for national and international investments to address EFCC issues in Bangladesh, coordinate implementation among all stakeholders and help the GoB realize its policy objectives on EFCC by guiding investment choices specified in the ADPs. The priority areas for investment in the EFCC sectors and estimation of financing by the GoB and development partners are identified in the BCIP EFCC. The BCIP EFCC recalled four thematic investment areas are called "Pillar" and 14 coherent and coordinated investment programmes that include 43 sub-programs under these programmes.

- Pillar 1 emphasizes the conservation of biodiversity, wetlands, rivers, marine ecosystems, and it has a specific look at river water improvement. It stressed also, enhancing the quantity and quality of forests through social forestry, reforestation, afforestation, coastal greenbelt development (e.g. mangrove plantations), landscape restoration and agroforestry.
- Pillar 2 focuses on reducing pollution from industries, municipalities, households, agriculture and other sources; restoring polluted and degraded ecosystems to produce the needed ecosystem services.
- Pillar 3 focuses on disaster risk reduction, sustainable infrastructure development, mitigation, low-carbon development and increased resilience at the community level.

- Pillar 4 aims to strengthen organizational capacity and processes for evidence-based decision-making of the GoB to implement and enforce such frameworks with better tools and technologies, information management, collaboration with multiple stakeholders and monitoring.

The estimated amount needed to meet the established targets by 2021 is about USD 11.7 billion, of which 40 per cent has already been financed through the government's sources and contributions from development partners. The BCIP EFCC is expected to offer a way of integrating natural resource management, environmental and climate-smart concepts and developing human and institutional capacity to improve programmes in the EFCC sectors sustainably. In doing these, it approached community-level management, Public Private Partnership (PPP), awareness-raising and capacity building along with stimulating gender equity and increase the inclusion of groups that are marginalized in environmental management with the following specific targets:

- Maple Croft's Climate change vulnerability index will be less than 1 by the end of 2021.
- Protected forest area as a proportion of total land area will be increased to 15% by the end of 2021.
- Total employment in forestry will increase by 10% every year (of which 2% increase will be for women).
- By the end of 2021 total area under coastal afforestation will be 14900ha.
- Gross value added in forestry will be 1.86% of overall GDP.
- The encroachment area will be decreased by 2021.
- Aquaculture plan in place by 2021 and at least 5 projects under conservation objective initiated.
- 4 additional Tidal river management schemes will be developed by 2021.
- Consumption of ozone-depleting H-CFCx (Ozone depleting potential) will be reduced to 47.2 tons in 2021.
- By 2021 about 64% of the produced waste will be disposed of in environmentally friendly landfills or controlled disposal sites in Dhaka.
- By 2021, 75% of urban solid waste will be regularly collected and with adequate final discharge out of total urban solid waste generated by cities.
- By 2021 readiness/ preparedness index will increase to 0.35.
- 5 % reduction by the end of 2021 of river flooded areas.
- 8270 Km of embankments will be improved by 2021.
- At least 10 studies will be made on Assessments related to water accounting and identification of water productivity gaps in draught prone areas.
- By 2030 emissions from the power and energy sector will be reduced to 5-18%.
- The environment and Gender index will be 50 by the end of 2021.
- By 2021 Climate expenditure (CPEIR) will be 2.17% of GDP.
- 75% of policies in EFCC will address gender issues by 2021.
- By 2021 Bangladesh will develop a Gender-responsive scorecard.
- By 2021 the of women in EFCC organizations should be increased to 30% at the National and Divisional level.
- By the end of 2021, Bangladesh will have a new knowledge center on Climate Change and environment and forestry-related issues.
- Full implementation of (Research Master Plan) RMP by 2021.

Implementation of SLCP Action Plan

The Department of Environment (DoE) prepared the updated SLCP National Action Plan (NAP) document based on the First NAP under the SLCP Project to strengthen and secure the national SLCP planning process. Identification and implementation of the most cost-effective pathways for large-scale implementation of SLCP

mitigation measures are expected outcomes of the Second NAP on SLCPs. This Second NAP aims to identify and implement further actions within the years 2010 to 2040 and complement the first National SLCP Action Plan of 2014. The specific goals pointed out in the SLCPs are:

- To strengthen and secure the national SLCP planning process started through the first phase of the National SLCP planning process in 2014.
- To update estimates of the major SLCP source sectors using the latest available data.
- To review the emission reduction potential of measures to reduce SLCP-related emissions from major source sectors.
- To recommend a set of priority measures that could, if implemented, achieve large SLCP related emission reductions.
- To identify the pathways for implementation of the priority measures in the context of current plans and activities in Bangladesh.
- To develop and implement an effective process for monitoring and evaluation of SLCP related activities, mitigation and implementing the measure recommended in this plan.

The Action Plan promotes improved biomass cookstoves, elimination of burning of municipal solid waste (MSW) in the open air, improved brick kilns, improved rice parboiling units and reduced open burning of crop residue. It also looked at caring high-emitting vehicles to reduce black carbon (BC) emissions and reduce CH_4 by improved manure and diet management for livestock, proper sewerage network and wastewater treatment plants. The action plan also focuses on reduced leakage from the natural gas transmission, distribution system and promoting advanced methods for flooded rice paddies and landfills. A few targets have been fixed to achieve these strategic objectives, which are:

- Black carbon emission reduction at 40% by 2030.
- Reduction of methane emissions by 17%.
- Replace traditional biomass cook stoves with improved biomass cook stoves and reduce emission by 50% by 2040.
- Elimination of open burning of MSW by landfills/composting, recycling will reduce emission by 100% in 2040.
- 87% emission reduction by replacing traditional brick kilns with improved ones by 2040.
- 100% emission reduction from burning crops residues.
- Replacing traditional rice parboiling units with improved ones, which will reduce 53% emission by 2040.
- Control of CH^4 emission from livestock mainly through farm-scale anaerobic digestion of cattle and poultry manure will reduce 15% emission by 2040.
- Establish/expand sewerage system and establish a municipal wastewater treatment plant in major urban centers.
- Elimination of high emitting vehicles.
- Avoid 9000 premature deaths in 2030 from reduced air pollution exposure.

Implementation of BDP2100

This plan aims at achieving a safe, climate-resilient and prosperous delta with a mission to ensure long term water and food security, economic growth and environmental sustainability. At the same time, it also focuses on effectively reducing vulnerability to natural disasters and building resilience to climate change and other delta challenges through robust, adaptive, integrated strategies and equitable water governance.

This plan set the following goals and targets in line with the ECC sector to support the ultimate vision and mission for a prosperous delta:

Goals

- Ensure Safety from Floods and Climate Change related Disasters
- Enhance Water Security and Efficiency of Water Usages
- Ensure Sustainably and Integrated River Systems and Estuaries Management
- Conserve and Preserve Wetlands and Ecosystems and Promote their Wise Use
- Develop Effective Institutions and Equitable Governance for In-Country and Trans-Boundary Water Resources Management
- Achieve Optimal and Integrated Use of Land and Water Resources

Targets

- Adopting flood and erosion protection along the Brahmaputra/Jamuna River aims to protect communities and their livelihoods.
- Protect the coastal population and their livelihoods under threat due to sea-level rise and salinity intrusion due to climate change. Programmes like polders/ embankments with proper design and O&M, salinity control through increasing upstream river flow by implementing the Padma Barrage, etc., could be considered.
- Undertake steps to augment water availability for agriculture, domestic and industrial activities during the dry season. In this regard, better management of available water resources would be required in future.
- With frequent heatwaves and intensifying thunderstorms, studies on climate change-induced temperature rising and intensity of cyclones may be conducted
- Public finance is expected to start at its current level of 0.8% of GDP; to grow to 1.3% of GDP by FY2025
- By 2020, BDT270 billion (US$3 billion) in public sector funds will be available, rising to BDT450 billion (US$6 billion) in 2025.
- Scale-up the private finance to 0.5% of GDP by FY2025.
- Total annual resources available are targeted to reach BDT 623 billion (US$8 billion) by FY2025 and grow with GDP thereafter.
- 99% of total expenditures on the plan will be publicly financed.
- Raise BDT370 billion (US$5 billion) in climate finance for the Climate Change Adaptation Programme.

The government will need to raise US$ 37 billion to implement the BDP 2100 investment plan by 2030, ensuring food and water security and fighting disasters, according to BDP 2100. However, the government spends only 0.8 per cent of GDP on delta management projects and programmes; this figure will need to be more than tripled to 2.5 per cent of GDP if 80 projects of the plan are to be implemented. To reach this total, Bangladesh is likely to get US$ 2 billion assistance from Green Climate Fund (GCF) every year if the case is effectively pursued. The remaining costs will be met from GoB own sources with the support of other development partners, foreign direct investment and the private sector. The Plan envisages that the private sector can generate sizable resources to finance the delta plan. According to its projection, Bangladesh will mobilize at least 0.5 per cent GDP per year from the private sector to fund the programme.

Out of 80 projects, 34 climate hotspots are identified with potential climate financing. Among these projects, 'Protection of River System Around Dhaka City with their Ecological Restoration Project' in 'Urban Area Hotspot' has both climate financing and private sector financing potentials. The table below shows the break-up of climate-relevant projects in different climate hotspots.

Table 3.7: Climate change relevant projects of BDP2100

Sl	Climate Hotspots	Total Projects	CC Relevant Projects
1	Coastal Zone	23	13
2	Rivers and Estuaries	7	5
3	Urban Areas	12	5
4	Barind and Drought Prone	9	0
5	Chattogram Hill Tracts	8	2
6	Haor and Waterland	6	4
7	Cross Cutting	15	5
	Total	**80**	**34**

Targets of 8th Five Year Plan (2021-2025)

The Government of Bangladesh (GoB) recognizes the importance of environmental sustainability and intensively tackling climate change to develop transformational economies of the country as per vision. Following the achievement continuity of the 7th Five Year Plan, this plan also envisions addressing the environment, climate change-related adaptation and mitigation, disaster risk reduction in a broader development context and recognizing the environmental concerns as an added challenge to reducing poverty and hunger, diseases and facilitating growth. A green growth strategy is envisaged to be incorporated under this planning cycle. Some specific targets which have been set under this plan for environmental management, climate change and forests are:

Table 3.8: Environment Management Targets of 8th FYP

Objectives	Base Year (2018)	Target (2025)
Per cent of urban centres with wastewater treatment facilities	N/A	50
Core environmental spending (% of GDP)	1	1.5
Spending by environment coordinating entity (% of GDP)	0.005	0.1
Application of polluter pays principle (% of cases)	0	40
Carbon tax (% of fuel prices)	0	5
Green area for Dhaka-major cities (square meter/million people)	N/A	1-4
Disaster risk reduction and management readiness (% of the population)	N/A	50
Urban water bodies compliance with water quality standards (%)	0	50
Air quality (annual average, µg/m3 PM 2.5)	86	60
Per cent of cities flood-free, with proper drainage	0	45
Per cent of land degraded	18	12
Area under forest cover (% of land) [base year 2015]	14.1	15.2
Protection of Habitat and Biodiversity International Ranking	Bottom 5%	Top 50%
Environmental Performance Index International Ranking	Bottom 5%	Top 50%

Climate Change Related Targets

8th Five-year plan emphasized enhanced climate financing by strengthening the national financing framework of BCCT and capacity building for resources harness, mobilization and utilization. Further, Nature-based Solutions (NbS) and Ecosystem-based Adaptation (EbA) are recommended to be adopted through the National Adaptation Plan process (NAP). Some specific qualitative targets and set objectives for climate change are listed down below:

- Mobilizing more than Taka 8000 crore to strengthen the Climate Change Trust Fund (CCTF) further as an instrument to support programmes for adaptation and mitigation
- Developing an international partnership with the leading organizations undertaking climate change adaptation and mitigation activities to draw lessons from the international experience so that innovative projects are funded to support effective measures against climate change

- Taking more measures to accelerate the accreditation of more NIEs for utilizing the Green Climate Fund (GCF)
- Ensuring third party monitoring of the Climate Change Trust Fund (CCTF) and proper usage of CCTF
- Facilitating the formulation and advancement of NAP process through giving priorities in Nature-based Solution (NbS) and Ecosystem-based Adaptation (EbA)
- Enhancing the activities to facilitate the technology transfer on adaptation and mitigation from developed countries through Climate Technology Centre and Network (CTCN) and Joint Crediting Mechanism (JCM)
- Increasing the understanding of how climate change is likely to affect the livelihood of local communities within the local government administration
- Identifying a localized solution to improve the effectiveness of measures for adaptation and enhance the state of adaptive capacity in the local government
- Facilitating improved coordination and knowledge sharing at the local levels through increasing the partnership with NGOs and civil society actors
- Investing in education, capacity building, training, technology transfer and environmental projects focusing on women
- Installing efficient systems for facilitating migrant integration into the city, adequate housing for new populations and job opportunities for migrated people due to erosion of land and the loss of rural livelihood as a consequence of climate change
- Undertaking a gender-transformative climate action in the coastal district to support 700 thousand coastal populations with more climate-resilient drinking water, livelihoods and early warning system
- Mainstreaming the principles of the LNOB across climate actions of the government through addressing the needs of the most vulnerable population
- Enhancing the capacity and role of parliament, IMED and OAG for improving governance mechanism for climate finance

Table 3.9: Forests and Ecosystem Management Targets of 8th FYP

S l . No.	Objectives	Targets
1	Bring 24% of the country's land under tree cover by the end of 2025	Hill Forest Restoration-1,30,580ha.
		Sal Forest Restoration in Plainland - 7,220ha.
		Reed land- 1500 ha.
		Agor plantation- 500 ha.
		Bamboo and cane plantation- 2000ha.
		Strip plantation- 15,000 km.
		Homestead/institutional planting and seedling distribution/sale- 100 million
		Medicinal plantation-1200 ha.
		Rare and Endangered Spp. (Seed Orchard and Arboretum Plantation)- 600ha.
		Management of bamboo regeneration area-10,000 ha.
		Co-management in PA -72,000 ha.
		Wildlife Protection (SMART patrolling in all PA and Combat transboundary wildlife crime)
		Species Conservation programme (Tiger, Elephant, Gharial, Dolphin, Vulture, Shark and Ray etc.)

2	Conserve eco-systems for biodiversity improvement	Habitat improvement-10,000 ha.
		Wildlife corridor identification and plantation-5,000 ha.
		Conduct one National Forest inventory.
		Establishment of Two Tissues-Culture Lab and related research
		Establishment of Seed orchard – 2 Nos
		Capacity development of FD and BFRI personnel -4,078 Persons
		Programme Participants and local stakeholder-3,21,630 man days
		Infrastructure Development at Division and Field level-1,000 Nos.
		Prey and predator survey in Sundarbans.
		Identify the wildlife habitat and corridors.
3	Mitigate climate change impacts and increase adaptive capability	Mangrove plantation- 50,000ha.
		Enrichment planting (Mangrove)-2,700ha. Jhaw-900ha.
		Golpata-1400km
		Conduct one GHG Inventory.
4	Improve the socio-economic condition of local poor and forest-dependent communities	Ecotourism development in Protected Area- 40 Nos.
		Scale-up alternative income-generating activity for forest-dependent communities-55,000 nos. families.
		Participatory/collaborative and sustainable management of NTFPs-40 Nos. PAs-55,000 nos. families.

Goals and Targets of Perspective Plan (2021-2041)

The Government of Bangladesh developed a perspective Plan for 2021-2041 (PP2041) to convert Vision 2041 into a development strategy with policies and programmes. The Vision 2041 is built on pursuing prosperity and at the same time inclusive society that caters for the need of the most vulnerable. The PP2041 focuses on environmental management by integrating environment and climate change considerations in the growth strategy and approaches for green growth. The strategies, policies and institutional reforms include: (a) Integrating Environmental Costs into the Macroeconomic Framework; (b) Implementing the Delta Plan to Build Resilience and Reduce Vulnerability to Climate Change; (c) Reduce Air and Water Pollution; (d) Removal of fuel subsidies; (e) Adoption of green tax on fossil fuel consumption; (f) Taxation of emission from industrial units; and (g) Prevention of surface water pollution. Importance is also given on sustainable management of forestry resources, conservation of biodiversity and strengthening the Blue Economy in this document. The document also mainstreams climate change adaptation and mitigation strategies to develop climate-smart technologies for sustainable agriculture and the environment.

PP2041 will focus on various financing options such as private financing options, public financing policies, tapping the Green Climate Fund (GCF) and mobilizing resources from other global funds along with strengthening Climate Change Trust Fund. To implement the strategies mentioned in the PP2041, the government will improve coordination among the different stakeholders.

Specifically, for the environment and climate change sector, PP 2041 envisions Bangladesh as:

- Some 80 per cent of the population lives in urban areas and enjoys a quality of life comparable to those found in the present-day high-income economies.
- There is a proper balance between ecology, the natural environment and the needs of the population. In particular, the productivity of land is preserved, forest resources are conserved and enriched, bio-diversity is improved, and water resources are appropriately managed to prevent flooding and water shortages
- Cities usually are flood-free with proper drainage, modern sewerage, proper waste management and clean air

- There is a minimal incidence of absolute poverty, there are no slums, and every household has an essential minimum housing quality.
- The country is equipped to respond fully and quickly to any incidence of natural disasters.
- Environmental governance is such whereby there is a sound mix of incentives and regulatory policies, including applying the polluter pays principle and a decentralized implementation of environmental policies and programmes.

Targets

The key targets set under the PP2041 for the Environment Climate Change sector are illustrated in the table below:

Table 3.10: Key targets set under the PP2041 for Environment Climate Change sector

Objectives/Targets	2018 Base Year Values	FY2041 Values
Share of urban population in total population (%)	30	80
Urban households with tap water connectivity (%)	40	100
Urban households with water-sealed sanitary toilets (%)	42	100
Urban households with modern sewerage connection (%)	N/A	100
Rural households with tap water connectivity (%)	0	50
Rural households with water-sealed sanitary toilets (%)	0	50
Rural households with safe sewerage connection	0	100
Incidence of poverty (%)	24	<3
Percent of population living in slums (%) Percent of household living in slums (UN definition)	55	0
Percent of urban centres with waste water treatment facilities	N/A	100
Core environmental spending (% of GDP)	1	3.5
Spending by environment coordinating entity (% of GDP)	0.005	0.5
Application of polluter pays principle (% of cases)	0	100
Carbon tax (% of fuel prices)	0	15
Green area for Dhaka-major cities (square meter per capita)	N/A	5-12
Disaster readiness (%)	N/A	100
Urban water bodies compliance with water quality standards (%)	0	100
Air quality (annual average, ug/m3 PM 2.5)	86	10
Percent of cities flood free with proper drainage	0	100
Percent of land degraded	18	5
Area under forest cover % of land)	15	20
Protection of Habitat and Biodiversity International Ranking	Bottom 5%	Top 30%
Environmental Performance Index International Ranking	Bottom 5%	Top 30%

3.4. Alignment with Sustainable Development Goals (SDGs) Targets

After adopting the agenda 2030, the Sustainable Development Goals (SDGs) by the UN and its member countries, Bangladesh has integrated the SDGs as key elements of the development agenda in its policies and plans. Bangladesh Delta Plan 2100 sets out many targets and strategies to achieve sustainable growth in terms of economy, society and environment while mitigating the climate change adversities. The government has also integrated the SDGs fully in the current five-year plan for 2016-2020 and developed Disaster Risk Reduction Strategies of Bangladesh during the period 2016-2020 following the Sendai Framework for Disaster Risk Reduction. The government has adopted Nationally Determined Contributions (NDCs) to ensure maximum utilization of the scarce resources, catalyze technology development, enhance capacities and skills to emission reduction and support the implementation of SDG. This also refers to the plans concerning climate change,

environment and disaster risk reduction, design projects, allocate budgets and take necessary initiatives accordingly. Critical initiatives have already been taken to create a green belt for protecting the coastal areas.

The SDGs are vital for ECC's sector as fourteen of the seventeen SDGs are related intricately to this sector. It is also to be mentioned that though the remaining SDG is not intricately associated with the ECC sector, the ECC sector influences the remaining goals. It will also help in achieving the remaining goals indirectly. The plans that are related to the ECC sector are following-

- Goal 2: Zero Hunger
- Goal 3: Good Health and Well-Being
- Goal 5: Gender Equality
- Goal 6: Clean water and sanitation
- Goal 7: Affordable and clean energy
- Goal 8: Decent Work and Economic Growth
- Goal 9: Industry, Innovation and Infrastructure
- Goal 11: Sustainable cities and communities
- Goal 12: Responsible consumption and production
- Goal 13: Climate action
- Goal 14: Life below water
- Goal 15: Life on land
- Goal 16: Peace, Justice and Strong Institution
- Goal 17: Partnership for the Goals

The government has, among others, already developed an SDG Action Plan due to being committed to achieving the SDGs by 2030, aligned the 7th Five Year Plan (7FYP) with the SDGs and also conducted a Mapping of Ministries by Targets in the implementation of SDGs aligning with 7FYP and developed a Monitoring and Evaluation Framework of SDGs from the perspective of Bangladesh's development pathway. Action Plan of Ministry of Environment, Forests and Climate Change (MoEFCC)- formerly known as Ministry of Environment and Forests (MoEF), by targets in the implementation of SDGs aligning with 7th Five Year Plan and beyond, is attached in Annex 1 for Reference.

The targets and the responsible ministries/divisions related to SDG 13 is as illustrated in SDG Action Plan prepared in 2017, are noted in the following table.

Table 3.11: Targets and the responsible Ministries/Division identified for SDG Action Plan

	Target	SDGs Implementation Ministry/Division and Comment
SDG 13 Climate Action	Ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters that progressively improve land and soil quality	Ministry of Agriculture Ministry of Environment, Forest and Climate Change, Ministry of Land, Ministry of Water Resources, Ministry of Disaster Management and Relief
	Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters	Ministry of Disaster Management and Relief Ministry of Environment and Forests Ministry of Home Affairs (MoHA)
	Integrate climate change measures into national policies, strategies and planning	Agriculture, Water Resources & Rural Institution Division and General Economics Division of Planning Commission, Ministry of Disaster Management and Relief Ministry of Environment, Forests and Climate Change

	13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	Ministry of Disaster Management and Relief Ministry of Education Ministry of Environment, Forests and Climate Change Ministry of Information and Broadcasting
	Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly US$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions, transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible	Economic Relations Division of Planning Commission Ministry of Environment and Forests Ministry of Foreign Affairs
	Promote mechanisms for raising capacity for effective climate change-related planning, management in the least developed countries and small island developing States, including focusing on women, youth, local and marginalized communities	Economic Relations Division of Planning Commission General Economics Division of Planning Commission Ministry of Environment and Forests

Below are some of the issues acknowledged by GoB in terms of climate change that connect the other SDGs:

Table 3.12: SDG targets relevant to environment and climate change

SDG1 **No Poverty**	Climate variability could cause a reduction of long-term rice production by 7.4 per cent per year over the years 2005 to 2050. A net loss amounting to US$ 26 million in agriculture GDP (gross domestic product) over the same period.
SDG2 **Zero Hunger**	Lower crop yields could result in at least 15 per cent net increase in poverty. Climate change can trigger displacement, forcing people to move to urban slums and end up in poverty traps.
SDG3 **Good Health and Well-being**	Climatic disasters (e.g. floods, cyclones) are often followed by water stress and waterborne diseases. Victims who survive such disasters suffer mental trauma.
SDG4 **Quality Education**	Damaged roads and infrastructures force children to drop out of school. Cyclone Sidr destroyed 5,927 educational institutes either partially or fully. An estimated 103,664 children were affected by this loss.
SDG5 **Gender Equality**	Women remain more vulnerable to climatic disasters. For example, the death ratio between women and men in the cyclone, Sidr was 5:1. Climate change will affect availability of natural resources and thus will affect rural women who are usually in charge of travelling the extra distance to collect resources for the household.
SDG6 **Clean Water and Sanitation**	Salinity intrusion in the coastal area impacts access to freshwater. Disasters also destroy existing drinking water and sanitation facilities.
SDG7 **Affordable and Clean Energy**	Energy is essential for development. Exploiting fossil fuels for energy will release greenhouse gases (GHGs) into the atmosphere, which will contribute to climate change.
SDG8 **Decent Work and Economic Growth**	Bangladesh is highly dependent on agriculture and fisheries, loss in these sectors results in overall GDP loss. Salinity intrusion threatens the jobs of agriculture labourers as well as the livelihoods of small-scale farmers.

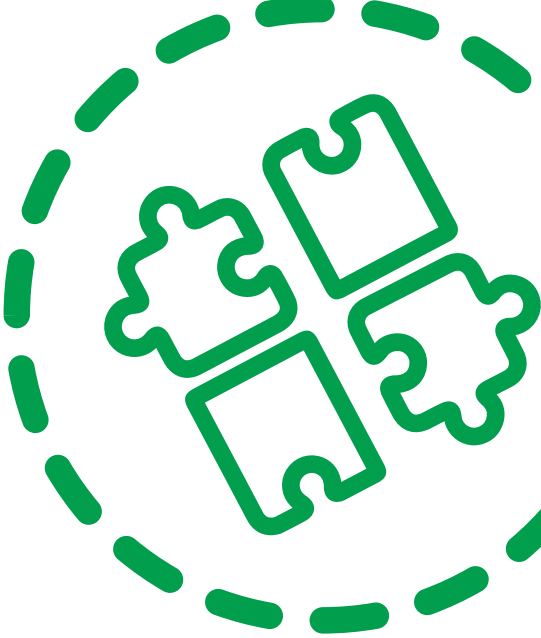
SDG9 **Industry, Innovation and Infrastructure**	Innovations such as renewable energy solutions could be major tools for mitigating climate change.
SDG10 **Reduced Inequalities**	Climate change will disproportionately affect marginal groups, making their situation worse and increasing inequality within the citizens of Bangladesh.
SDG11 **Sustainable Cities and Communities**	Migrants who move to cities will exert stress on urban infrastructure and services. Also, climatic situations such as heavy rainfall and heatwaves will affect urban systems.
SDG12 **Responsible consumption and production**	Bangladesh is growing economically, which means increased industrialization. This will result in an extensive use of fossil fuels and will lead to environmental degradation.
SDG14 **Life below water**	As the sea surface temperature rises due to climate change, the composition of the water bodies in Bangladesh will see changes and lead to loss of species. Salinity intrusion will impact both fresh water and marine fisheries.
SDG15 **Life on Land**	Sundarbans – the largest mangrove forest in the world is a natural carbon dioxide sink. It also serves as a natural barrier to tropical storms. Sundarban-based ecosystem services will be impacted by climate change.
SDG16 **Peace, Justice and Strong Institutions**	By building effective, inclusive and accountable institutions at all levels, it will be possible to establish good governance within various institutions in Bangladesh. A study conducted by Bhuiyan (2015)1 denoted the lack of good governance as one of the key barriers for climate adaptation.

Source: Citizen's Platform for SDGs, Bangladesh. 2017

3.5. Cascading and Synchronization of Targets

Several national documents and policies have been developed based on different emerging issues from time to time. Still, the structural and hierarchal differences between all these plans make it difficult to compare and align them with each other. However, cascading and synchronizing is required in developing SAP in the ECC sector to find out the crosscutting, overlapping and gaps issues of the existing policy documents related to the ECC sector. Firstly, all the national targets relevant to ECC as outlined in earlier sections have been screened. The targets have been merged if any overlapping targets are found and the ECC section targets have been chosen. After that, the aligned goals and targets have been screened following the ECC theme. Finally, the targets for the SAP have been developed through synchronizing the national targets and SDG targets which has been reflected and incorporated in result-based monitoring and evaluation framework to track the future progress of this SAP. During this process, some cross-cutting issues have been found against multiple themes, which have been maintained while providing the same indicator in multiple themes where required. Due to a lack of measurable and quantifiable data, no specific target was found while synchronizing the national target and SDG target against some themes of SAP.

Further analysis found similarities in the content under the different terminologies of different documents. Accordingly, synchronization has been done, such as the goals of BDP 2100 and objectives of the 7FYP and 8FYP. They have followed a similar format and can be regarded as objectives. On the other hand, the pillars of BCIP EFCC and thematic pillars of BCCSAP can also be seen as objectives if the inherent purposes of these pillars are considered like thematic pillar 1 of BCCSAP. Its "Food Security, Social Protection and Health" theme and the intrinsic intent can be assumed as "Enhancement of food security, social protection and health issues due to climate change". Thus, for simplifying the analysis, the pillars of BCIP EFCC, thematic pillars of BCCSAP, goals of BDP2100 and objectives of 7FYP and 8FYP were considered the same level. The synchronized national and SDG targets with SAP ECC objectives are provided in Annex 2.



CHAPTER 4

Strategy and Action Plan

4.1 Setting Principle

The amalgamation of all hazard-related information, challenges, potential impacts, already led to planned strategies, activities and their corresponding targets, target achievement status, gaps and lessons learnt from achievement status. Policy directives, principles have been set for the ECC sector action plan. The principle would consider the implementation ability of the action plan in the short term or during immediate FYP and beyond that up to 2030 and alignment with government vision and SDGs keeping in mind the following:

- Addressing gaps between Five Year Plan and Annual Development programme
- Implement ability during 8th FYP and beyond
- Alignment with national development vision and international agenda like SDGs
- Promote sustainable development without jeopardizing the environment and considering deep uncertainties of climate change

The government visions have been understood firstly to set the principles for developing the strategies for SAP in the ECC sector. Then ECC boundaries have been devised while analyzing the major issues and challenges in the ECC sector. In addition, all the achievement, national goals of government plans and policies have been reviewed. Further, all existing policies and plans have been assessed along with the international agenda and purpose. Then synchronization of the objectives among different approaches has been done based on the ECC sector. After that, following principles have been considered for developing strategies for SAP in the ECC sector.

Multi-disciplinary and Complementary

ECC is a vast sector and has cross-cutting nature, which requires the engagement of multiple sectors. On the other hand, without complementing each other among the agencies, the SAP cannot be successful. Despite having a key agency that will manage and coordinate among the agencies related to the ECC sector, the support of the other agencies is a must. So multi-disciplinary and complementary principles have been considered while setting the strategies for SAP in the ECC sector.

Participatory and Inclusive

To develop the SAP as a holistic one, it should be participatory and inclusive. A bottom-up approach has been followed to ensure participation from all levels and sectors while prioritizing social inclusion, gender mainstreaming, community-based adaptation and integration of local knowledge issues.

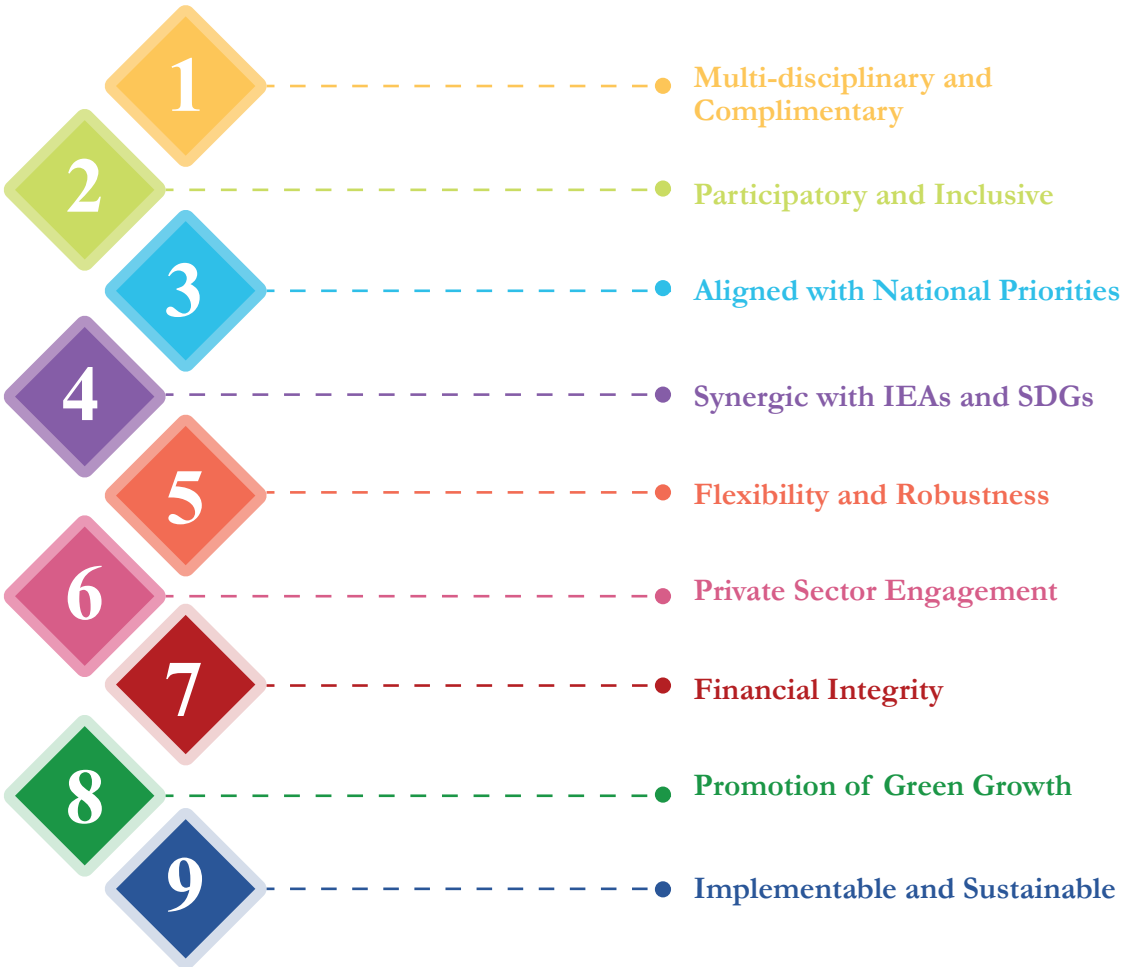


Figure 4.1: Principles of SAP ECC

Aligned with National Priorities

Having a contribution in achieving national development through various national agendas is one of the main objectives of developing the SAP in the ECC sector. In this regard, priority has been given to alignment with all the national visions, including Vision 2021, targets of Five Year Plans, LDC Graduation by 2026 and Vision 2041, while preparing the strategies for SAP. Further, alignment with the ongoing updated BCCSAP, National Adaptation Plan and Mujib Climate Prosperity Plan has been recommended to be followed for the future.

Synergy with International Environmental Agreement on ECC and SDG

The SAP for ECC has been aligned with an international environmental agreement like Paris Agreement, Sendai Framework on Disaster Risk Reduction, Agenda 2030, and Sustainable Development Goals to synergy this national plan with international plans and policies to become a developed nation in the global platform.

Flexibility and Robustness

It has also been considered that the selected strategic actions must be flexible and robust. To have the adaptive implementation nature of the SAP, the projects implemented to achieve the activities must be flexible. On the other hand, the actions and selected projects must also bring benefits in multiple sectors representing the robust nature of SAP.

Private Sector Engagement

Emphasis has been given to the engagement of the private sector for the implementation of SAP on ECC. The private sector has a key role and has much to contribute to the planning, development, and implementation of climate adaptation strategies through sector-specific expertise, financing, technology, efficiency, entrepreneurship, and financing through PPP projects. Therefore, the private sector engagement has been considered while SAP's strategies and relevant assignments on ECC have been chosen. This will reduce the burden on the public sector as well.

Financial Integrity

The investment plan for SAP has been developed considering financial integrity. The performance indicator has been considered so that all the monitoring, evaluation and reviewing programmes ensure financial integrity. A result-based monitoring and evaluation framework has been anticipated in this regard based on SMART indicators and the existing Annual Performance Agreement (APA) framework. Further, integration and coordination with climate fiscal framework and environmental fiscal framework are suggested.

Promotion of Green Growth

The concept of Green Growth has been promoted in every possible sector in this SAP for ECC, including Climate Change Adaptation (CCA), Climate Change Mitigation (CCM), pollution control, urban development and environment management etc. The implementation of ecosystem-based projects is quite reasonable, which also brings significant benefits. For this reason, Green Growth has been promoted in all aspects of SAP for the ECC Sector. Emission target achievement as per INDC, 2015 will also be facilitated with this green development principle. Ecosystem-based Adaptation (EbA), Low Impact Development (LID) and Nature-based Solutions (NbS), these three novel concepts that are prioritized for accelerating the process of green growth in this plan.

Implementable and Sustainable

The SAP ECC focuses on devising specific programmes and projects which are feasible and implementable as per the stipulated timeline. It also considers that all formulated programmes or schemes will be sustainable enough to portray the development pathway at the desired level. The implementation timeline has been chosen to evaluate the feasibility and sustainability of implementation.

4.2 Strategy for Action

Based on set principles as outlined in the above sections, strategic actions for this ECC sector plan have been proposed considering the synchronized targets to be fulfilled by 2030 and beyond to achieve GoB Vision 2021 and Vision 2041. A total 43 strategies have been set to achieve the targets of the ECC sector. They are as following:

Table 4.1: Proposed strategies for SAP ECC

Thematic Areas	Strategies for Action
T1: Local Level Climate Change Adaptation and Resilient Infrastructures	1. Promote initiatives to enhance climate resilience of communities among cross-cutting sectors and different levels 2. Integrating climate change adaptation into local level development planning 3. Ensure participation of women, marginalized groups in climate resilient development and decision-making process 4. Integration of community and their local knowledges for sustainable climate resilient environment management 5. Development of climate resilient infrastructures and cities 6. Promote adaptive and flexible structural interventions to tackle deep uncertainties of climate change 7. Mainstream and Scaling up Nature-based-Solutions (NbS) for Climate Change Adaptation

Thematic Areas	Strategies for Action
T2: Green Growth and Low Carbon Development	1. Reducing carbon emission through introducing innovative low carbon technologies, pro-forestation, afforestation and increased use of renewable energy 2. Introduce and promotion of low carbon development and green infrastructures 3. Promotion of investment for Nature-based-Solutions (NbS) to accelerate green growth
T3: Urban Environment Management	1. Ensure sustainable management of urban environment considering climate change and other environmental degradation 2. Integrate Low Impact Development (LID) or Best Management Practices (BMP) for urban environment development and management 3. Increase green areas and biodiversity in urban areas 4. Ensure conservation and protection of urban wetlands and ecosystem
T4: Pollution Control	1. Improvement of pollution control mechanism in Bangladesh 2. Ensure Beneficiary Pays Principle 3. Ensure strict enforcement of the 'Polluter Pay' principle 4. Development of improved waste (solid, liquid, e-waste, medical, chemical/ hazardous etc.) management system 5. Introduce and encourage 4R and bio-initiatives for waste management to turn 'waste' into 'energy.'
T5: Blue Economy	1. Sustainable and Integrated Water Resources Management aligned with BDP2100 and SDGs considering adversities of climate change 2. Turn 'Blue' into 'Resources', and it's wise Harness 3. Establish a policy framework for unlocking the potentials of the blue economy 4. Ensure conservation and sustainable use of the coast and marine resources
T6: Forests, Ecosystem and Biodiversity	1. Ensure conservation and sustainable management of Forests, Ecosystem and Biodiversity 2. Encourage wise use of wetlands and introduce and integrate 'Payment for Ecosystem Services' in development planning 3. Ensure wildlife conservation and its habitat 4. Promote pro-forestation along with afforestation for conservation of forest, ecosystem and biodiversity
T7: Food Security, Social Protection and Health	1. Ensure increased agricultural productivity in the face of environmental problems and climate change adversities 2. Promote research and extension of stress-tolerant varieties or species 3. A massive expansion of climate-smart agriculture practices 4. Promotion of agricultural diversification and expansion of horticultural crops 5. Crop zoning, land use planning and promotion of precision agriculture 6. Ensure food and nutrition security, social safety net and good health against the negative impact of climate change and unexpected pandemics like COVID19
T8: Institutional Strengthening, Coordination and Governance	1. Enhance collaboration among public, private sectors, GO/NGO, Civil Societies and Academia 2. Ensure both vertical and horizontal coordination among ministries and agencies 3. Improvement of governance of environment and climate change through integrated and coordinated enforcement mechanism increased transparency and accountability 4. Promote and ensure proper and effective use of enforcement tools and techniques 5. Ensure availability and accessibility of climate finance in a sustainable way to facilitate investment for climate change adaptation and mitigation 6. Promote private sector engagement in climate financing along with public sector 7. Enhance the use of ICT for knowledge, data and information sharing
T9: Research, Innovation and Capacity Development	1. Enhance institutional capacity and human skill development to mainstream climate change and environmental issues into the development planning and implementation process 2. Encourage innovative research and knowledge management to bridge the lesson learned with emerging developments 3. Enhance opportunities for collaborative research with academia

Strategies have been set as per defined theme and respective scopes elaborated in section 2.1 vested upon the guiding principles of the earlier section. These strategies are highly complementary, although strategies have been set under each of the themes separately. Actions oriented on one single strategy can be beneficial for other multiple strategies as well. Many strategies are proposed for local-level climate change adaptation and constructing climate-resilient infrastructures for inclusively enhancing climate resilience. Institutional strengthening, coordination and governance theme have also been emphasized with several strategies, as coordination has been emphasized very strongly through the planning process due to the cross-cutting nature of the ECC sector. Transparency and accountability for ECC governance and sustainability of climate finance are an integral part of institutional strengthening and coordination. Promotion of green growth or development and sustainable development pathways are reflected among most of the set strategies.

4.3 Development and Prioritization of Action Plan

A total 103 projects under 9 themes have been proposed (Annex-3) for the Sector Action Plan on Environment and Climate Change. The action plan has been prepared with an implementation period of 10 years, starting from 2020-21, i.e. 8th FYP till 2030 (9th FYP). All these projects are proposed to be started immediately during the 8th Five Year Plan period considering the high priority of these projects for Environment and Climate Change. However, full implementation may require beyond the 8th Five Year Plan period till 2030. Therefore, a 10 years implementation period has been selected for this plan. All proposed projects have been developed with rigorous reviewing following strategies or policy framework relevant to Environment and Climate Change; formulation of which took place during 7th Five Year Plan period:

- Bangladesh Delta Plan 2100 (2018)
- SDG Action Plan (2016-2020)
- Action Plan for Short-Lived Climate Pollutants (2018)
- 7th Five Year Plan (2016-2020)
- 8th Five Year Plan (2021-2025)
- Bangladesh Country Investment Plan for Environment, Forest and Climate Change (2016-2020)
- Bangladesh Climate Change Trust
- Second Perspective Plan (2021-2041)

After a thorough review of the proposed projects or strategic actions of these plans or policies and making a complete inventory of all potential projects (more than 1200) list, many overlapping strategic activities or duplication of many projects are found. These have been extensively screened and avoided the delicacies to prepare the final list of projects (around 500). From that list, 103 high priority projects have been finally selected to be started during the 8th Five Year Plan till 2030. This prioritization process considered the following criteria:

- Satisfy devised strategies and scopes of the SAP ECC
- Synchronized with the targets of national Vision 2021 and Vision 2041
- Flexibility and robustness of actions
- Facilitate to pave the way for green growth and low carbon development
- Enhance the resilience of the community and nation
- Capacity to facilitate achievements of SDGs 2030
- Potentials to fulfil the needs of stakeholders
- Enable securing investment
- Gender inclusiveness

The action plan includes project name, the key implementing agency, supporting agencies, tentative budget, duration, phasing of investment and potentiality to private sector engagement. A total investment of BDT 133,589 crore is proposed to be required to implement the action plan throughout the 10 years. Among the thematic areas, Local Level Climate Change Adaptation and Resilient Infrastructures (T1) top the budget allocation with around 25% of the total investment for 18 no. of proposed projects. At the same time, Pollution Control (T4), Blue Economy (T5) and Green Growth and Low Carbon Development (T2) follow the allocation of 18%, 16% and 14% budget, respectively. Around 9% budget is allocated for Urban Environment Management (T3) and Forest, Ecosystem and Biodiversity Management (T6). Food Security, Social Protection and Health (T7) has got 5% allocation considering this theme's climate change and environmental aspects. However, this has

been anticipated that a separate SAP will be developed to allocate more budget for every part of agriculture, including its crop, fisheries and livestock sub-sectors for food and nutrition security. Similarly, a separate SAP for Social Protection, Security and Health is envisaged to develop to invest specifically for disaster risk reduction and preparedness, livelihood protection, health and social safety net.

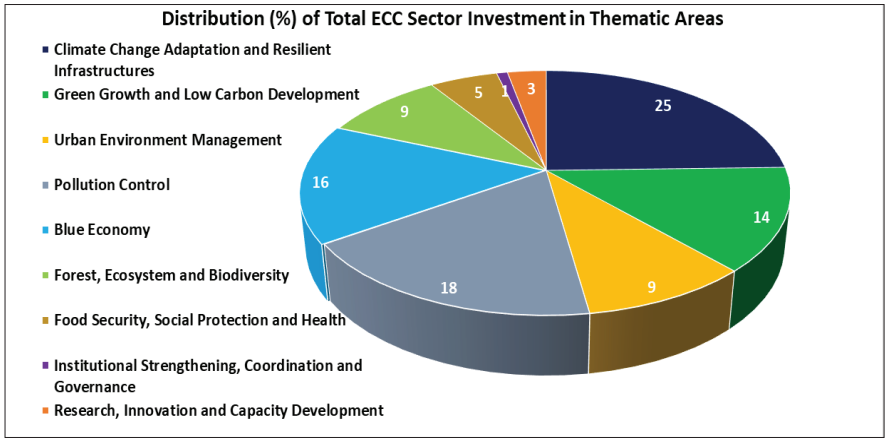


Figure 4.2: Distribution of SAP ECC investment allocations

In a nutshell, 58% of total investment are proposed for 55 projects to be spent for Environment management, 38% for 27 projects to address Climate Change Adaptation and Mitigation for Climate Resilience and the rest 4% for 21 projects to develop enabling environment and capacity for Environment and Climate Change. The following table illustrates the investment cost against the total number of proposed projects for each thematic area.

Table 4.2: Summary of the proposed investment plan of SAP ECC

Theme Code	Theme Name	Total Investment Cost in Crore BDT				No. of Total Projects
		Short Term (less than 3 years)	Medium Term (3 to 6 years)	Long Term (beyond 6 years)	Total	
T1	Local Level Climate Change Adaptation and Resilient Infrastructures	3939	27900	1000	32,839	18
T2	Green Growth and Low Carbon Development	60	10000	8100	18,160	9
T3	Urban Environment Management	2135	10500		12,635	8
T4	Pollution Control	1415	17500	5000	23,915	17
T5	Blue Economy	830	20200		21,030	7
T6	Forest, Ecosystem and Biodiversity	1905	10700		12,605	15
T7	Food Security, Social Protection and Health	1155	6000		7,155	8
T8	Institutional Strengthening, Coordination and Governance	1020	130		1,150	9
T9	Research, Innovation and Capacity Development	1100	3000		4100	12
Total Investment Cost of SAP ECC		**13559**	**105930**	**14100**	**133,589**	**103**

Project implementation duration has been considered as short (up to 3 years), medium (up to 6 years) and long term (up to 6 years). A total 54 short term projects, 44 medium projects and 5 long term projects have been proposed with BDT 13559 crore, BDT 105930 crores and BDT 14100 crore, respectively. The distribution of projects as per project duration for each theme is illustrated in the figure below:

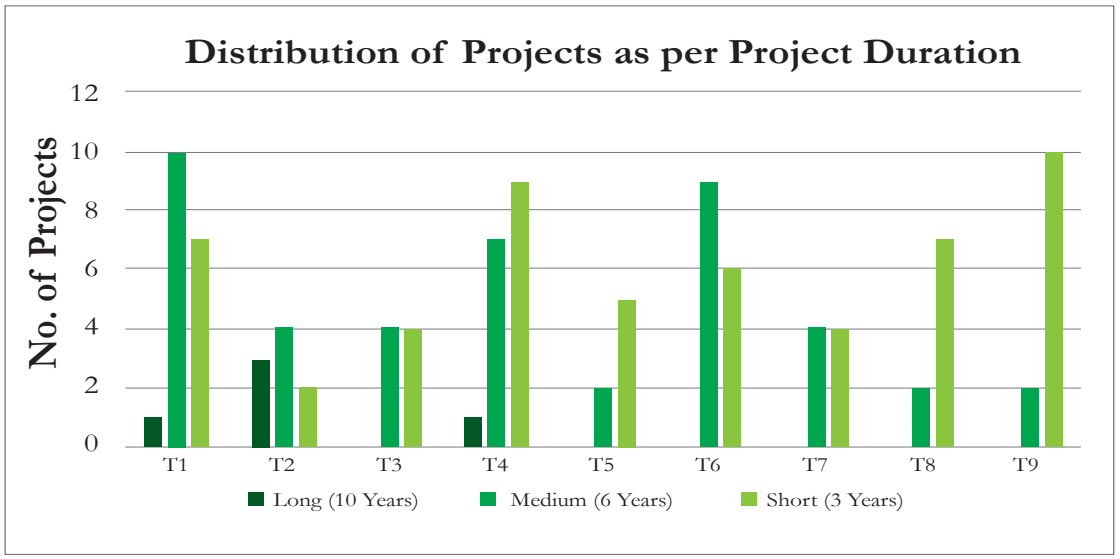


Figure 4.3 Distribution of projects as per project duration

Engagement of multi-sectoral stakeholders is anticipated during the scoping of the boundary, considering the cross-cutting nature of the Environment and Climate change sector. The proposed investment plan and identified responsibilities of lead implementing agencies or ministries and supporting or coordinating agencies or ministries reflected the same. The key implementing entities are found DoE, BFD, BNH, BFRI, BFIDC, BCCT under MoEFCC; DBWHD, WARPO, BWDB, CEGIS, IWM under MoWR, DAE, NARS Institutes under MoA, DLS, DoF, BFRI, BLRI under MoFL, LGD, City Corporations, WASAs, RDCD, LGED, DPHE under MoLGRDC, SREDA under MoPEMR, DDM under MoDMR, MoI, BBS, GED, PD and AWRD under MoP, Prime Minister's Office (PMO). While, many other stakeholders are identified as supporting or coordinating entities, including MoWCA, MoS, MoC, MoRTB, LGIs, District Administration, Academia, private sectors, IUCN, ICCCAD C3ER, BSMRMU, Industrial Police, BMDA, Planning Commission, IDCOL, PKSF etc.

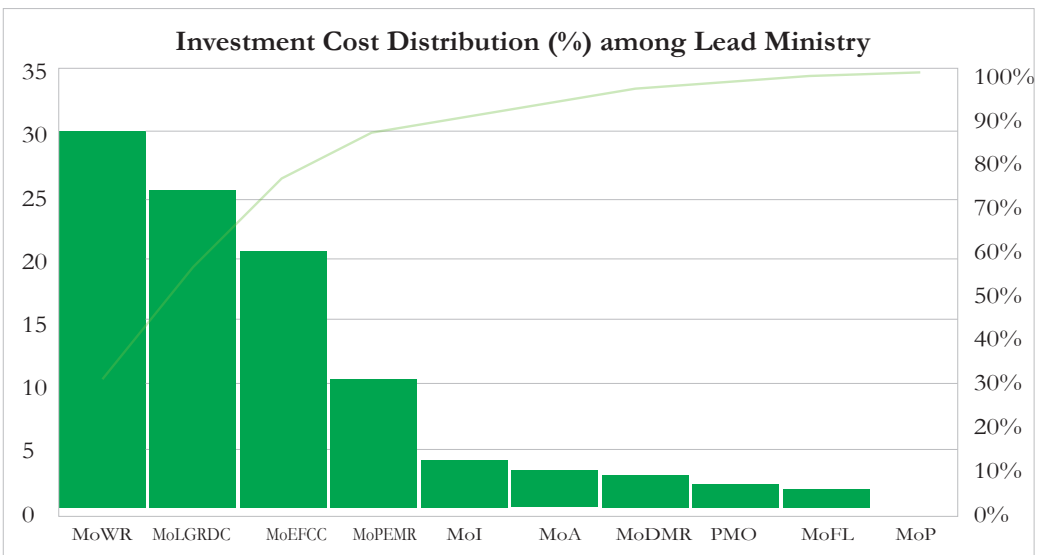


Figure 4.4: SAP ECC investment cost distribution among lead ministries

As a lead implementing ministry, the highest budget has been allocated for MoWR, which is around 30% of total investment, followed by MoLGRDC (about 25%), MoEFCC (approximately 20%), MoPEMR (around 10%), MoI (4%), MoA (3%) and MoDMR (3%). Approximately 2% budget has been allocated to implement Mujib Climate Prosperity Plan Decade 2030 by the MCPP Unit of PMO. The rest are distributed among MoFL and BBS under MoP.

The engagement potentiality of private sectors is also explored and found a total of 41 projects are suitable to engage private sectors at a different level of extent. Engagement of private sectors has been anticipated either for investment or implementing entity or as a direct beneficiary or coordinating entity. The potentiality of private sector engagement is found on a large scale almost in every climate change mitigation-related project. However, the potentiality in adaptation initiatives is not so less and mostly emphasized for waste management, pollution control, NAP and Mujib Climate property plan, promotion of nature-based solutions and low impact developments for city landscaping, plastic management, small scale dredging, expansion of ecotourism etc. The distribution of potential projects for private sector engagement is shown in the figure below:

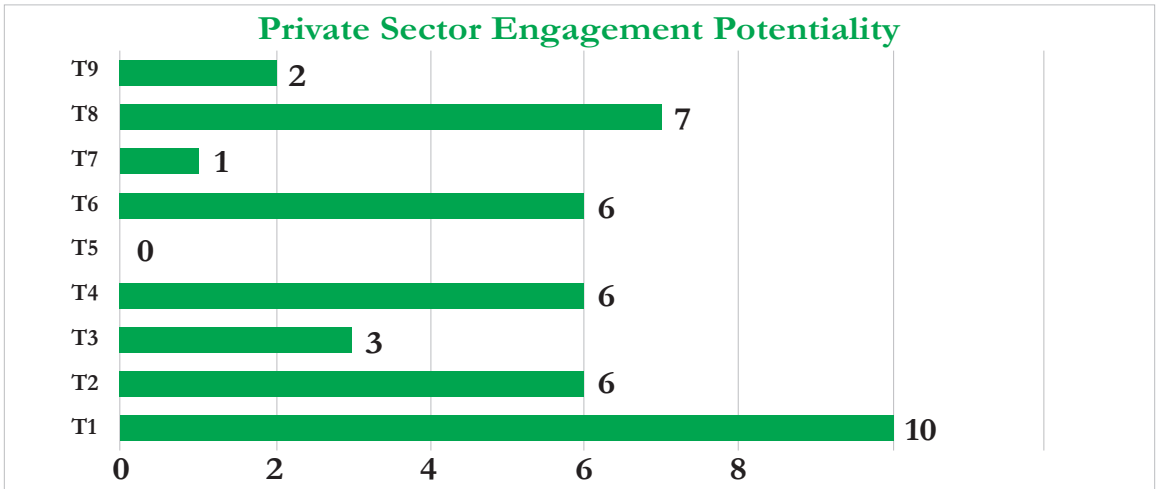


Figure 4.5: Private sector engagement potentiality for proposed investment plan

4.4 Phasing of Investment

The 10 years SAP-ECC includes an investment plan for two phases, i.e. 8th FYP and 9th FYP. In these two phases, total 103 projects are expected to be implemented, among which 54 are short term projects (duration 3 years or less), 44 are medium-term projects (time 6 years or less), and 5 are long term projects (duration 10 years or less). The investment would need to increase gradually during the 8th FYP period and then it will decrease over 9th FYP span. The highest investment would be needed in FY 2023-24, which is estimated at BDT 27894 crore as compared lowest investment of BDT 705 crore in both FY 2028-29 and FY 2029-30. However, the interim update of this SAP ECC after every 3 years may add additional or adjusted investment needs in the ECC sector. In total, 41 projects have been found very appropriate where the private sector may be engaged to implement the project partially or fully.

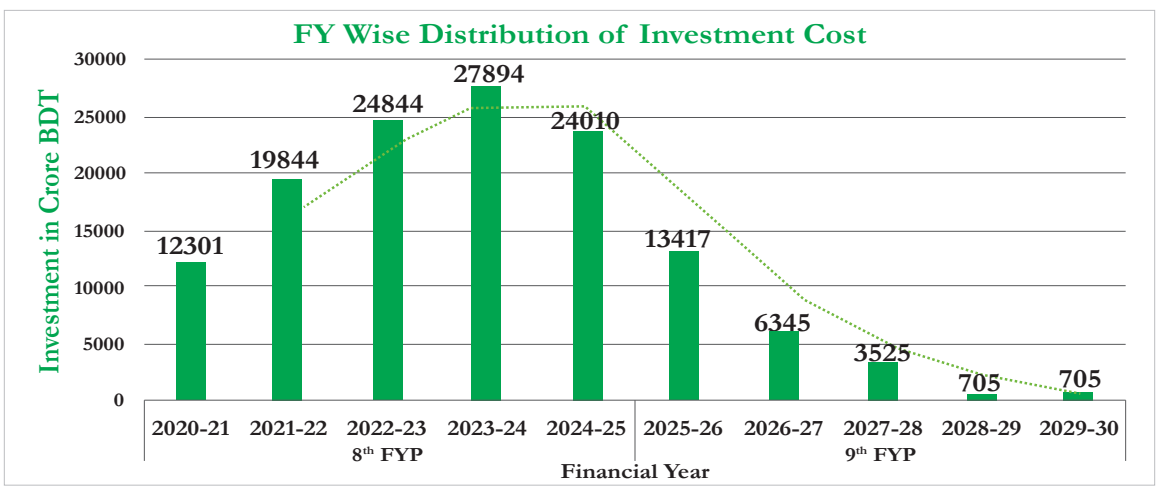


Figure 4.6: Phasing of investment for SAP ECC

CHAPTER 5

Implementation Mechanism

5.1. Implementation Process

Projects developed under the Sectoral Action Plan (SAP) will be undertaken by the government and implemented through different line agencies under different ministries and receive specific fund allocations. A total of 103 projects have been developed for the 43 strategies under the 9 thematic areas of the ECC. As the prime agency, MoEFCC will spearhead the implementation of the bulk of the projects through its agencies such as DoE, FD, BFIDC, BNH, BCCT and BFRI. Other key implementing agencies are from different ministries, i.e. MoWR, MoLGRDC, MoPEMR, MoI, MoA, MoDMR, MoFL and MoP, who will need strong coordination with MoEFCC for smooth and successful implementation. Usually, each agency will have to follow its mandate, primarily focusing on a particular theme as per the set definition in this SAP ECC, sometimes without proper attention to such development activities' effect on other thematic areas. Such overlaps will be envisaged and addressed centrally by the government before chalking out tasks and responsibilities. The private sector may also find some portfolios suitable for implementation and funds may be mobilized for implementation, as 41 potential projects are already identified for Private Sector Engagement (PSE).

Prioritization of projects and budget allocations adjustment will need to be done according to project priority and implementation timeframe. The investment plan will assist the respective implementing agencies to prepare full-fledged project proposals according to the government-approved format. However, a provision for feasibility study including dedicated climate change and disaster impact assessment for each project will be required, which must be included under the Annual Development Programme of Bangladesh. These will assess each project's technical viability, environmental sustainability, social acceptability and financial integrity via pitting costing against benefit returns. Detailed DPP for every project will be developed whereby costing will be specified, finalized and thus forwarded to ADP for incorporation within the implementation pipeline. This Sectoral Action Plan is aimed at bridging between ADP and Five Year planning circle.

Among the thematic areas, Local Level Climate Change Adaptation, Resilient Infrastructures and Pollution Control top the budget allocation priority with 25% and 18% allocations, respectively. Emphasis has also been given to Green Growth and Low Carbon Development, Forest, Ecosystem and Biodiversity and Blue Economy. Major funding sources will include the GCF, Adaptation Fund, BCCTF, BCCRF, WB, ADB, UNDP, Private Sectors, Environment and Biodiversity Fund, Development Assistance etc. These allocations will be spared during the 10-year implementation timeframe. Monitoring and evaluation as per the result-based framework will enable any adjustments of budget allocations, maladaptation and update the whole plan with the changed priority of the country.

With the amalgamation of multiple agencies and their diverse activities, the Plan's objectives are practically achievable, depending on successful implementation through timely initiation of activities. The performance will be the responsibility of the line agencies concerned. The critical assumption is the allocation and availability of government funds channeled through line agencies in a timely fashion with the overall coordination of respective

ministries. The implementing agencies will follow the existing rules and regulations and ensure good governance. Other ministries will have an essential role in supporting the implementation of this Sectoral Action Plan.

5.2. Financing Mechanism

The financing mechanism has been formulated by providing strategies under two board heads. One is for exploring potential fund sources and another is for successful arrangement and mobilization of the fund from those sources.

Potential Sources of Fund

For financing the SAP ECC related activities, several national and international funding mechanisms are available from both public and private sources. At the national level, a major source is a public finance. Over the years, the GoB has allocated a considerable amount of its resources for ECC related activities. GoB has established the BCCTF for funding climate change-related activities. The Government channels every year resources for significant investment in projects/programmes for ensuring climate resilience. It currently spends US$1 billion a year, around 6 to 7 per cent of its annual budget (MoF, 2020), on climate change adaptation, which is nearly a fifth of the US$5.7 billion that the World Bank estimates Bangladesh will need as adaptation finance by 2050. Three-quarters of money spent on climate change in the country comes directly from the government, while the rest comes from international development partners. The Bangladesh Bank and other private and state-owned banks provide green financing for ECC related businesses and projects. A major funding source can be fines collected for violating environmental laws and fees for ECC associated services provided by the GoB departments. An assessment should be conducted to evaluate the potential contribution from the above two sources properly. Moreover, the financing should be performed in a coordinated way so that climate financing can be done as part of financial solutions like an investment of solid waste management if done separately, which have co-benefits of climate change adaptation and mitigation. The government also encourages mitigation efforts by embarking on solar energy projects, afforestation programmes in climate hotspots, promoting new technology to replace coal-fired kilns, etc.

At the international level, funding is available from bilateral and multi-lateral technical agencies and financial institutions in grants and loans. There are international private financial institutions that also provide loans in different forms. Some of these financial institutions offer financial services in the means of equity or risk-sharing. There are international insurance agencies that offer different types of insurance packages.

The major international sources of climate finance are: Global Environment Facility (GEF), Adaption Fund, Least Developed Countries Fund (LDCF), Adaptation for Smallholder Agriculture Programme (ASAP), Global Climate Change Alliance (GCCA), Climate Investment Funds, UN-REDD Readiness Programme, and recently established Green Climate Fund (GCF), which is the main global vehicle for disbursing climate finance from developed countries to poorer nations.

The Global Environment Facility (GEF)- The GEF, which aims to tackle the planet's most pressing environmental issues, has funded 43 projects in Bangladesh, with a total of US$160 million in the form of grants and US$1037 million as additional co-financing. GEF also manages the UNFCCC funds, including the Least Developed Countries Fund (LDCF), the Special Climate Change Fund (SCCF) and the Adaptation Fund.

Adaptation Fund- The Adaptation Fund finances projects and programmes that help vulnerable communities in developing countries adapt to climate change. Initiatives are based on country needs, views and priorities. The Adaptation Fund was established to finance concrete adaptation projects and programmes in developing countries that are parties to the Kyoto Protocol and are particularly vulnerable to the adverse effects of climate change. Since 2010, the Adaptation Fund has committed more than US$ 830 million for climate change adaptation, resilience projects and programmes, including more than 120 concrete, localized projects in the most vulnerable communities of developing countries around the world with 28 million total beneficiaries. It also pioneered Direct Access, empowering governments to access funding and develop projects directly through accredited national implementing entities. The Adaptation Fund, for the first time, has approved US$10 million for a project in Bangladesh, aiming to enhance the resilience of vulnerable communities of small islands and riverine Charland islands. The project titled "Adaptation Initiative for Climate Vulnerable Offshore Small Island and

Riverine Charland in Bangladesh" is jointly implemented by the MoEFCC and the United Nations Development Programme (UNDP).

Green Climate Fund- The primary vehicle for channeling international climate finance is the Green Climate Fund (GCF). Bangladesh has so far received US$ 94.7 million as a grant from GCF for four projects. That includes Climate Resilient Infrastructure Mainstreaming, Enhancing Adaptive Capacities of Coastal Communities, Cope with Climate Change Induced Salinity, Global Clean Cooking Programme-Bangladesh and Extended Community Climate Change Project-Flood (ECCP-Flood).

Climate Investment Funds (CIF)- A total of US$110 million in grants and near-zero interest credits from the Pilot Programme for Climate Resilience (PPCR) is improving climate-resilient agriculture and food security; strengthening the safety and reliability of freshwater supply, sanitation and infrastructure; enhancing the resilience of coastal communities and infrastructure in Bangladesh. Another US$75 million in grants and low-cost financing from the Scaling-up Renewable Energy in Low-Income Countries Programme (SREP) is helping to kick-start investment in utility-scale renewable energy projects and expand off-grid solar markets. There are 9 CIF funded projects in Bangladesh.

Bilateral and Multilateral Channels- In addition to these funds, other significant channels of climate funding for Bangladesh are bilateral development assistance agencies such as FCDO in the United Kingdom, USAID in the United States, Swedish SIDA and GIZ in Germany, Federal Ministry for Economic Cooperation and Development (BMZ), Kreditanstalt für Wiederaufbau (KfW), Japan International Cooperation Agency (JICA), Norwegian Embassy, Agence Française de Développement (AFD) etc., as well as multilateral banks or agencies such as World Bank and Asian Development Bank (ADB), International Finance Corporation (IFC), European Investment Bank (EIB), HSBC Holdings plc, International Fund for Agricultural Development (IFAD), International Union for Conservation of Nature (IUCN) and UN agencies such as UNDP, UNEP, FAO, WFP etc.

Private Funding- Private sector funds from developed countries to developing countries are likely to become a significant source of climate funding going forward. This is primarily because the investment community realizes that they live in a highly volatile situation, further aggravating climate change. However, given the profit motive which drives private investments, they will primarily be investing in mitigation rather than in adaptation activities, as it is pretty challenging to generate revenue from adaptation intervention

CSR funds from the private sector at present are typically being used for socio-economic development, such as the construction of schools. There is a window of opportunity for funding from the private sector by levying taxes for carbon emissions or pollution control. Apart from the different climate financing sources, funding for implementation of this ECC sector plan can be harnessed and mobilized through different Environment or biodiversity funds. For instances:

"Debt-for-nature" swaps have proved successful, for example. However, most such swaps have been fairly small, relative to the debt of many developing countries and their conservation and development needs.

The Environment Fund is a true green investment – and benefits all nations or member states of the United Nations Environment Programme (UNEP). In 2020, the Environment Fund provided US$ 74.2 million, or 15 per cent, of the UN Environment Programme's (UNEP) total income. The Environment Fund is used for:

- Implementation of seven thematic sub-programmes of UNEP;
- Identification of new emerging environmental issues (such as through our Frontiers-series);
- Several science-policy platforms that bring together scientists, governments, industrial and international organizations, and civil society;
- Innovation for addressing environmental challenges;
- Advocacy and awareness-raising on environmental issues;
- Capacity building and transfer of technological innovations;
- Results-based planning and management;
- Bringing together governments, the private sector and civil society in advancing the global environmental agenda, for example, through the UN Environment Assembly;

Nature+ Accelerator Fund is going to be launched in 2021 by IUCN to promote and invest in nature-based solutions, including the following areas: Marine conservation and coastal resilience; smallholder production systems and sustainable agriculture; ecosystem conservation and restoration; and innovation in services, finance and technology. The Accelerator will offer investment in three complementary investment windows: Seed, Early Venture (together defined as the incubation period) and Venture windows. It will support the early-stage pilots and project ideas, impact enterprises with high potential for scalability, complemented by technical assistance and capacity building. This Fund will also offer investors a 30% "first loss" protection to mitigate early-stage risk. The Fund will deploy grants, debt and equity through three windows:

- Seed: US$5 million (approx. US$100,000 per 50 projects) in repayable grants or convertible notes
- Early venture: Debt and equity of US$15 million (approximately US$1 million per 15 projects)
- Venture: Debt and equity of US$20 million (approx. US$5 million in 4 projects)

This fund will create evidence of a suite of Nature-based Solutions (NbS) aligned with the IUCN Global Standard for Nature-based Solutions. These Fund-supported projects would significantly impact biodiversity and ecosystem conservation, reduce the risk of extinction of species following the IUCN Red List and contribute to the national and global objectives. It would also have a referential contribution to the CBD post-2020 Global Biodiversity Framework, Sustainable Development Goals (SDGs), the UN Decade on Ecosystem Restoration and the UNFCCC Paris Agreement. Like these funds, other available funds, i.e. conservation of biodiversity or waste management related funds, can also be explored to harness the required funding for proposed projects under this SAP-ECC.

Financing Strategy

Accessing international climate finance can be a challenging task; the complicated architecture of global climate and environment finance appears to be a barrier for countries such as Bangladesh. Fund delivery modalities induce a competitive environment for the developing countries and their delivery partners in managing their shares in international climate finance. Enhanced institutional capacity is a pre-condition to overcome the access barriers as most of these funds follow high standard fiduciary systems and environmental and social safeguards. Good management practice, transparency and track records are essential to gaining direct access to international climate finance. Many multi-lateral development partners run global readiness programmes for LDCs to enable them to access international climate finance. However, in such a context, the GIZ, UNDP, or GCF offers mainly readiness support that focuses on enhancing the institutional capacity of the focal point and NDAs (National Designated Authority). They also extend support in identifying the potential NIEs (National Implementing Entities) and their capacity building and developing a strategic framework for the funds.

It depends on the country capacity to make the best use of readiness support and get equipped for direct access to climate funds.

National Designated Authority (NDA) is a government-designated institution or agency in a country to facilitate interface and function as the main point of communication between the government and the GCF. The Economic Relations Division of the Ministry of Finance is the NDA for Bangladesh. The role of NDA is to recommend funding proposals for projects and programmes to the GCF Board, developing in the context of national climate strategies and plans. In this regard, the NDA's role is to ensure that proposals are prepared through a broad-based multi-stakeholder consultation process. Specific Roles of NDA are:

- Provide broad strategic oversight of the Funds' activities in Bangladesh
- Convene relevant public, private and civil society stakeholders to identify priority sectors to be financed by the Fund
- Communicate nomination letters to entities (sub-national, national or regional, public and private) seeking accreditation to the fund under the 'direct access.'
- Implement the no-objection procedure on funding proposals submitted to the Fund to ensure consistency of funding proposals with national climate change plans and priorities

- Provide leadership on the deployment of readiness and preparatory support funding in the country

On the other hand, National Implementing Entities (NIE) are accredited entities expected to mobilize and manage GCF finance in a country. The primary roles of NIEs are to:

- Develop and submit funding proposals for projects and programmes
- Oversee project and programme management and implementation
- Deploy a range of financial instruments (grants, concessional loans, equity and guarantees)
- Mobilize private sector capital

To date, two institutions in Bangladesh have been accredited as NIEs. The NIEs are Infrastructure Development Company Ltd. (IDCOL) and Palli Karma-Sahayak Foundation (PKSF). Other potential NIEs are the Local Government Engineering Department (LGED), Bangladesh Bank, Bangladesh Climate Change Trust (BCCT) and Department of Environment (DoE). In addition, Multilateral Implementing Entities are also operating in Bangladesh to mobilize funds for climate financing.

Coordination and collaboration with the NDA, NIEs or MIEs in case of climate funds or accessing other assistance tools for environment and biodiversity conservation-related funds are thus essential and highly recommended to ensure proper financing of proposed projects and strategic actions along with the Government's contribution. In this regard, strengthening existing NIEs and accreditation of other NIEs are envisaged to be done gradually through this plan implementation period.

5.3. Institutional Arrangement

Effective implementation of national policy, plan and programmes relies on the existing governance framework and underlying institutional structures. The Sector Action Plan is essentially cross-sectoral and implementation arrangements involve multiple line ministries, local government institutions, communities and the private sector. Thus, the provisions like governance framework and institutional arrangement, etc., contain an additional value for SAP implementation. Specification of roles and functions, the interdependence of activities and a structured strategy are essential criteria for integrating SAP in the operational setup. Against the backdrop of limited resources and gradually increasing demand, the key financial issues fundamentally depend on the current policy context and institutional framework provisions. They are i) prioritizing demands to allocate funding and ii) how successful strategies are introduced to produce the maximum outcomes with available resources.

In changing over time as per the situational requirement, every institution needs to be dynamic and competent. With a proactive framework requiring realistic approaches focused on Bangladesh's existing socio-political conditions and functioning under the context of the overall capability limits of public administration, structural reforms will grow further as advancements are made. As mentioned earlier, SAPs should identify gaps, propose actions and activities for achieving defined sectoral goals. SAPs are designed to be dynamic strategies that translate goals into action for different sectors (GED Concept Note, 2016, p. 2). This dynamic planning approach should be replicated to organizations too.

In this context, this section aims to establish a simple minimum core structure of the institutional framework without which SAP implementation would struggle to achieve its goals. Along with establishing the institutional framework, detailed SWOT analysis of the key implementing agencies has been done to identify the existing gaps. Based on the identified gaps, some recommendations have also been made which would help to minimize the gaps and strengthen the key implementing agencies as per the recommendations, which are vital towards the successful implementation of SAP.

Key Implementing Agencies

The SAP is a multi-stakeholder planning approach. In this aspect, it is essential to set up a management and monitoring mechanism with the involvement of all related ministries and agencies for effective project planning and implementation. The implementation, coordination and monitoring of the SAP will require continuous communication and coordination among key implementing and supporting relevant agencies of sector ECC. These communications may include exchanging project details and documentation that can be used to monitor

indicators, analyzes and policy development consultations and evaluation of the outcomes to create more robust collaboration and more successful outcomes. The coordination and cooperation among the key ministries and line agencies will strengthen the existing institutional framework for SAP implementation in every stage, i.e. project design, appraisal, implementation, operation and maintenance, monitoring and evaluation.

Critical analysis of the broader scope of the SAP-ECC by its thematic areas and the given investment plan reveals the key implementing entities. DoE, BFD, BNH, BFRI, BFIDC, BCCT under MoEFCC as prime stakeholders of this plan; However, other ministries and line agencies are also integrated with this cross-cutting sectoral plan. They are DBWHD, WARPO, BWDB, CEGIS, IWM under MoWR, DAE, NARS Institutes under MoA, DLS, DoF, BFRI, BLRI under MoFL, LGD, City Corporations, WASAs, RDCD, LGED, DPHE under MoLGRDC, SREDA, EMRD under MoPEMR, DDM under MoDMR, MoI, BBS under MoP, Prime Minister's Office (PMO). While, many other stakeholders are identified as supporting entities, i.e. GED, AWRD and PD of Planning Commission, MoWCA, MoS, MoC, MoRTB, LGIs, District Administration, Academia, private sectors, IUCN, ICCCAD, C3ER, BSMRMU, Industrial Police, BMDA, IDCOL, PKSF etc. The SAP-ECC will not remain limited to these agencies or ministries only, rather keep close liaison and coordination with others as necessary for the plan's implementation. Such other entities could be development partners, civil society, private sectors, regional and global networks, NGOs or INGOs also have a strong role in this.

Besides, the research institutes and universities have a significant role in transforming knowledge into practice through new and innovative ideas for battling climate change impacts. Partnership and knowledge sharing among different research or academia related to environment and climate change could enhance the overall quality of the programme's implementation. Bangladesh Country Investment Plan for Environment, Forestry and Climate Change (2016-2020) listed relevant research institutes and universities who are engaging in the endeavor of environment and climate change areas, blended with those this SAP ECC identified an updated list which is as follows:

- Bangladesh Academy for Rural Development (BARD), Cumilla
- Bangladesh Agricultural University (BAU), Mymensingh
- Bangladesh Agriculture Research Council (BARC)
- Bangladesh Agriculture Research Institute (BARI)
- Bangladesh Centre for Advanced Studies (BCAS)
- Bangladesh Development Research Centre (BDRC)
- Bangladesh Fisheries Research Institute (BFRI)
- Bangladesh Forest Research Institute (BFRI)
- Bangladesh Institute for Development Studies (BIDS)
- Bangladesh Institute of Nuclear Agriculture (BINA)
- Bangladesh Livestock Research Institute (BLRI)
- Bangladesh Rice Research Institute (BRRI)
- Bangladesh University of Engineering and Technology (BUET)
- Center for Climate Change & Sustainability Research, DUET
- Center for Environmental and Climate Change Research (CECCR), CUET
- Center of Energy Research (CER), UIU
- Centre for Climate Change and Environment Research (C3ER), BRAC University
- Centre for Environmental and Geographic Information Services (CEGIS)
- Centre for Policy Dialogue (CPD)
- Climate Change & Health Promotion Unit, Ministry of Health
- Climate Resilient Local Infrastructure Center (CreLIC), LGED

- Department of Agroforestry & Environment at Bangabandhu Sheikh Mujibur Rahman Agricultural University
- Department of Disaster Management Begum Rokeya University Rangpur
- Department of Forestry and Environmental Science at Shahjalal University of Science and Technology, Sylhet
- Department of Geography and Environment, Jahangirnagar University
- Forestry and Wood Technology Discipline, Khulna University
- Institute for Forestry and Environmental Sciences at Chattogram University
- Institute of Disaster Management and Vulnerability Studies, University of Dhaka
- Institute of Environmental Science, University of Rajshahi
- Institute of Water and Flood Management (IWFM), BUET
- Institute of Water Modeling (IWM)
- International Centre for Climate Change and Development (ICCCAD), Independent University
- International Centre for Diarrhoeal Diseases Research, Bangladesh (ICDDR, B)
- National Academy for Planning and Development (NAPD)
- National Agriculture Research System (NARS)
- National Institute for Local Government (NILG)
- Policy Research Institute (PRI)
- Research Centre, North South University
- River Research Institute (RRI), Faridpur
- Rural Development Academy (RDA), Bogura
- Sylhet Agricultural University Research System (SAURES)

Risk and Challenges for Implementation

Implementation of any plan involves a certain level of risks and challenges. These risks stem from various causes and conditions related to implementing government agencies, their actions and sometimes also policy actions. Knowing which pitfalls can emerge could help to prevent them and can lead to a more proactive approach. During the process, identification is necessary to solve challenges. Several evaluations and strategic guiding government documents such as climate fiscal framework and situation analysis of Bangladesh climate finance, country investment plan etc., highlight the challenges further in project planning, development and implementation for environment and climate change areas.

The identified implementing entities have their institutional mechanism and strategies to carry out the SAP ECC implementation. However, apart from the review of government documents, several challenges are identified in the existing framework through systemic analysis of key implementing entities' strengths, weaknesses, opportunities and threats (SWOT), mainly focusing on implementing SAP ECC. The outcome generated from the SWOT analysis is based on indicators, i.e., institutional arrangements, policy and legal framework, project implementation capability, fund allocation and mobilization mechanism, knowledge/capacity, monitoring and evaluation mechanism and accountability. Rigorous consultation with relevant stakeholders through Key Informant Interviews (KIIs) reveal the outcome of SWOT, which are summarized as follows with some strategic actions to minimize those challenges:

NATIONAL DEVELOPMENT PLANNING AND COORDINATION

There is some disagreement about climate change coordination responsibilities within the GoB. The Climate Fiscal Framework indicated that the Climate Change Unit (CCU) of the MoEFCC was responsible for supervising and coordinating BCCRF and BCCTF activities. Although the MoEFCC was the designated lead on climate change

issues for the GoB, it did not have a well-defined role in coordinating climate finance or providing guidance on climate change priorities, actions and costs. The Climate Fiscal Framework also noted key roles for the ministries of planning and finance.

Multiple GoB institutions were responsible for the coordination of internal and external climate finance. For internal climate finance, the Programming Division within the Ministry of Planning coordinated the Annual Development Programme process, with input from the line ministries. The BCCTF project operated outside the ADP process, with the ministries submitting project descriptions to the BCCTF's Board of Trustees for approval. The MoEFCC planned to establish a CIP Coordination and Monitoring Unit to ensure that this plan is used internally and monitor progress.

Therefore, the efficient and active functionality of a unit on Environment and Climate Change may resolve these challenges. This unit will need to be capacitated in strategic planning, coordination and project cycle management and will be aligned with the vision and targets of the ECC sector properly.

MONITORING, TRANSPARENCY AND ACCOUNTABILITY

Governance challenges affect the government's ability to access more climate finance from development partners and attract private sector participation. These challenges include the need for greater commitment, transparency and accountability. There is a need for improvements in managing the environment and climate change sector, finance system and results achieved from a 'whole-of-government perspective, coordination, strategic planning, technical capacity, knowledge management and MRV systems. Monitoring, transparency and accountability are very key elements for project financing from international climate change-related financing sources. So, enhanced monitoring and transparency will need to be widely implemented in the ECC sector to maintain the desired finance flow.

Furthermore, other noteworthy challenges are highlighted in the box below:

- ***Inadequate budget allocation for O&M:*** Budget allocation for Operation and Maintenance (O&M) is enormously inadequate
- ***Disintegrated Responsibilities of Institutions:*** Activities related to the ECC are handled by all key implementing agency separately rather than as an integrated activity or output. Therefore, the disintegrated responsibilities among these entities generally hampers the successful implementation of such activities.
- ***Weak Prioritization Mechanism:*** Most of the key selected implementing agencies have very weak or no specific mechanism for prioritizing the environment and climate change-related projects.
- ***Insufficient Human Resources:*** Lack of skilled and sufficient human resources, infrastructure, logistics, etc. hampers the project related activities to a great extent.
- ***Lack of Training on ECC***: Due to lack of proper training on ECC, adequate human resources program and mandate related issues, many agencies still depend on consultants for devising any detailed technical solutions. Leadership skill development among young professionals for global climate negotiation should be another utmost focus area.
- ***Inadequate Private sector Engagement with ECC related Projects:*** The engagement of the private sector in ECC related projects is still inadequate.
- ***Less Interests on Prioritization of Long-term Strategies:*** Instead of prioritizing long-term or permanent strategies, there is still a tendency to prioritizing short-term response-based strategies.
- ***Inadequate Funds for Research and knowledge Generation:*** The allocation of funds for research and knowledge generation is inadequate.

Institutional Framework for Implementing the SAP ECC

A new unit/commission named National Environment and Climate Change Unit may be established either in MoEFCC or in the General Economics Division (GED) of the Planning Commission to enhance the management, implementation, coordination and monitoring of the SAP-ECC. A similar unit is proposed in BEFCC CIP; however, the necessity of such a unit is a prerequisite for planning, implementation, coordination and monitoring of environment and climate change-related projects, explicitly addressing the gaps and challenges through SWOT analysis. This proposed unit will also serve the purpose for BEFCC CIP, as SAP ECC is facilitating the implementation of CIP, which is solely focused on the ECC sector. However, anchoring the proposed NECCU either in GED or MoEFCC and designing its detailed tasks and strength are subject to further scrutiny and review, for which an in-depth study will be needed.

The below illustration is an example of positioning the 'National Environment and Climate Change Unit' into the current institutional and coordination framework. National Environment and Climate Change Unit (NECCU) will function under the supervision of the National Steering Committee on Environment and Climate Change (NSCECC) and Technical Advisory Committee (TAC), comprising of high-level policymakers and relevant experts.

Proposed Institutional Framework for Implementing the SAP ECC

The mandate of the National Environment and Climate Change Unit (NECCU) will be to oversee the development mechanism of SAP ECC and its fruitful implementation. The NECCU will comprise 5 separate cells to carry out its functions: Management and Coordination Cell, Planning, Appraisal and Project Selection Cell, External Coordination and Finance Cell, Monitoring and Evaluation Cell, Technical and Others Support related cell. Proposed functions of these cells with specific roles and responsibilities of lead members are described below:

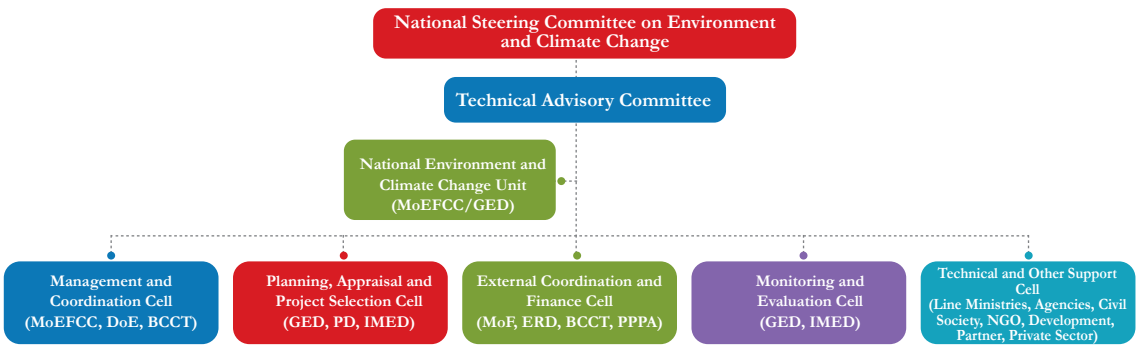


Figure 5.1: Institutional framework for implementing the SAP ECC

MANAGEMENT AND COORDINATION CELL

DoE, BCCT, BCCRF can be a member of this cell to maintain coordination in the whole unit while MoEFCC can lead this cell. The cell will coordinate with the selected various key ministries, divisions, and agencies related to SAP ECC to enhance their activities and get a better approach for the smooth implementation of the plan. Moreover, the other relevant crosscutting agencies will be coordinated by this cell. The cell will coordinate among them in implementing ECC related projects. The cell will work closely with the ministries and divisions to align ADP portfolios with SAP ECC policy objectives. The cell can be given the responsibility to create a knowledge hub and conduct information management activities. The cell will also coordinate knowledge and data sharing and exchange among parties relevant to the ECC sector. In addition, this cell would connect with the ECCDS cell of BBS to get access to the updated environment, climate change and disaster-related statistics and information. This cell should facilitate the technology transfer on adaptation and mitigation from developed countries through Climate Technology Centre and Network (CTCN) and Joint Crediting Mechanism (JCM).

PLANNING, APPRAISAL AND PROJECT SELECTION CELL

GED can take the lead of this cell with PD and IMED of Planning Commission as a member. The primary function would be to conduct review, analysis and research of EFCC-related policies to facilitate the planning, appraisal and selection of projects for implementation. They can assist relevant negotiation teams in national and international platforms and plan and prepare the documents needed for negotiation and policy development. The cell will also research ECC related projects and use the data from knowledge for future planning. The GED can look over the alignment of the project planning with the plans like updated BCCSAP, National Adaptation Plan (NAP) and Mujib Climate Prosperity Plan or even with existing Bangladesh Delta Plan 2100 to avoid potential overlapping investment. PD and IMED can advocate to include the project Annual Development Programme (ADP) in an inclusive way examining proper resources allocation and ensuring appraisal of the projects with the prescribed format. The inclusion of dedicated climate change and disaster risk screening through an adequate tool like the DIA framework will be ensured as part of the appraisal and project selection. They will prepare a common prioritization mechanism for project selection for the ministries, divisions or agencies working in the sector.

EXTERNAL COORDINATION AND FINANCE CELL

This cell will be led by the Economic Relations Division of the Ministry of Finance. BCCT can be a member of this cell as well. Arrangement of funding, financial assessment for the projects will be the primary duty of the cell. The cell will also look forward to accessing foreign funds, i.e. GCF, Adaptation Fund, Environment or Biodiversity related funds etc. The cell will maintain liaison with National Implementing Entities (NIEs) like IDCOL, PKSF and try to get accreditation of more NIEs from potential parties. The close collaboration with the development partners, PPPA under PMOs and private sectors for arrangement funding will also be taken care of by this cell.

MONITORING AND EVALUATION CELL

General Economics Division (GED) can take the lead of the cell. The cell will prepare a common internal M&E mechanism and guideline for the relevant ministries, agencies and divisions to track the plan's progress. The policy guidance will also be carried out by the cell. They will compile the progress and implementation reports of sectoral agencies and submit them to GED so that GED can provide policy feedback as per the requirement. They will also seek suggestions from the External Coordination and Finance Cell for assisting them in fund allocation suggestions for the M&E mechanism. The cell will also conduct overall M&E for the projects with the input of IMED utilizing the prescribed result-based M&E framework of the SAP ECC. This cell should also coordinate with the ECCDS and SDGs tracker to align and be consistent with the national progress. The system-level monitoring may be facilitated through tracking constant improvement with the National Priority Indicators (NPI) for Environment and Climate Change sector stated in the 8th Five Year Plan.

TECHNICAL AND OTHER SUPPORT CELL

This cell will be consisting of multi-disciplinary members from various line ministries, agencies, civil society, development partners, private sector, academia etc., to support the other cells. The line ministries are also implementing climate-relevant programmes through ADPs. Each ministry and agency's environment and climate change focal points can work together in the cell headed by MoEFCC. They can improve the Development Project Proforma (DPP) process for climate change projects and mainstream climate change considerations in other projects and monitor and evaluate projects. Apart from dedicated BCCT finance, development partners also provide technical and financial support to the Government of Bangladesh through different programmes and projects in disaster management, environment and climate change areas. The private sector players have the potential to catalyze sustainable development and green growth in Bangladesh. The research institutes and universities have a significant role in transforming knowledge into practice through new and innovative ideas for battling climate change impacts. Successful piloting of the research output could further be scaled up in different programmes interventions. Partnership and knowledge sharing among various stakeholders related to the environment and climate change could enhance the overall quality of the programme's implementation. Hence, this multi-stakeholder cell will be a vital part of the successful SAP implementation by providing expert support to all the National Environment and Climate Change Unit cells.

Institutional Strengthening Mechanism

The proposed institutional framework for SAP ECC will address the challenges identified for the existing institutional framework. However, some selected key implementing agencies need to be strengthened further, considering the challenges identified during the SWOT analysis. Some major recommendations that may enhance the existing institutional arrangement are as follows:

- Budget allocation for Operation and Maintenance (O&M) needs to be increased to implement and sustain the projects successfully.
- Well-organized and robust coordination between the key agencies and other line agencies must be ensured for successful planning and execution projects.
- Prioritization of long term or permanent strategies instead of short-term response-based strategies need to be ensured.
- Mandates should also be updated (if required) to address ECC related issues.
- Training on the environment and climate change for the relevant staff need to be organized regularly.
- There is a tremendous undiscovered opportunity to engage the private sector in ECC related projects which should be encouraged.
- More research funds need to be allocated so that key implementing agencies can conduct their research to develop ownership.
- Along with a robust coordination mechanism, effective and holistic monitoring and evaluation mechanisms need to be established to manage a project successfully, understand the project's outcome and prepare a future strategy based on the experience.
- The agencies' ownership attitude needs to be developed while implementing projects is also necessary for effective implementation of SAP.

Besides, the committee and cells proposed in the section of institutional framework, roles and responsibilities of responsible agencies will need to perform harmonized to ensure the successful implementation of SAP ECC. The strategic actions advised to risk and challenges of implementation will need to be adequately addressed. If the assigned entities perform their roles and responsibilities effectively and efficiently, then the planning, monitoring, coordination and implementation of environment and climate change-related projects would be done smoothly.

Private Sector Engagement Mechanism

A total of 41 projects have been proposed under this SAP ECC suitable to engage the private sector. An enhanced effort and effective mechanism can successfully engage the private sector in identified projects at a different level of extent.

Enhanced private sector engagement is possible if the following four steps can be followed fruitfully. They are: i) Creating Enabling Environment ii) Identifying Priority Sector and Selecting Investors Properly iii) Selection of Proper Modalities and iv) Effective Monitoring, Evaluation and Coordination

Possible strategies to follow these four steps are elaborated below:

i) Developing Enabling Environment:

Awareness Building Programme: Companies or investors often lack detailed knowledge about climate change impact on their business. So, raising private sector awareness of the potential impacts of climate change on their business can create an enabling environment for their engagement.

Providing Incentives: GoB can provide incentives like funding facilities to encourage the private sector to invest in ECC projects. Already GoB has taken several incentives for the benefits of investors in PPP projects like-

1. *Viability Gap Fund:* This is a budgetary fund to provide a financial subsidy for PPP projects components with high socio-economic value but is not sufficiently viable to be delivered on a PPP basis. In this case, up to 30% of the total project cost can be subsided as part of a capital contribution during construction, or it can be in the form of annuity payments during operation.

2. *Public-Private Partnership Technical Assistance Financing(PPPTAF)*: This provides a strong instrument to improve the quality and development impact of the project. The PPPTAF intends to achieve more private investment in the country's infrastructure development through the provision of Technical Assistance (TA) and expert services.

3. *Fiscal Incentives:* Introduce provisions permitting PPP investors to benefit from various budgetary incentives like reduced import tax on capital goods and different tax holidays to minimize the project implementation cost and enhance the project's viability.

4. *Special Incentives:* Any specific project may get special incentives or other non-fiscal incentives to support policy objectives or enhance the ease and efficiency of delivering the project, including exemption from particular provisions related to insurance regulations, banking regulations, foreign exchange regulations etc.

5. *Unsolicited Proposals:* The government has permitted unsolicited proposals to deliver PPP projects to encourage private investor participation and innovation in PPP projects. The unsolicited bidder is incentivized through the application of either the Swiss Challenge System or Bonus System.

Institutional Arrangement and Capacity Building: To successfully engage the private sector, the government must ensure that the enabling environment is in place through proper legislation and policies that offer assurance and stability of the private sector while investing. Besides arranging training sessions to train private investors on how to access the funds, invest in PPP etc., it will also build up the capacity of the private sector for investing in PPP projects.

Introducing user-pays and beneficiary-pays principles: Promoting users-pay and beneficiary-pay principles will allow revenue sources to attract private finance. Tariffs need to be adjusted with measures gradually phased in to reach cost-recovery levels while providing adequate protection for the poor.

ii) Priority Sector and Investor Selection:

Though private sectors have specific competencies to make a unique contribution to climate change adaptation, the trends of private sector investments in Bangladesh indicates that these projects are mainly based on mitigation because of comparatively easy accessibility to international market mechanism and short-term return of investment. However, easy access in mobilizing financial resources, promoting climate-friendly technologies, leveraging governments', civil society and community efforts and developing innovative climate services and adaptation technologies provide extra leverage to the private sector. Because of the existing tradition of user charges and significant domestic and international experience in structuring such transactions, it is easier to attract private finance in the transport, water supply, sanitation and energy sectors. Besides, seven projects out of 80 in the Delta investment Plan have been identified as pioneer projects suitable for private financing. These seven projects fall into one or more of the following categories: embankment with the road, large-scale irrigation, inland water transportation, dredging and/or land reclamation, water supply and sewerage system. The causes behind choosing this sector for PPP project to private financing are given below-

1. Irrigation projects can be undertaken as PPPs by engaging private firms to build and finance new irrigation infrastructure, operate and maintain the system, supply water to irrigators following specified schedules, quantities and charge for the water supplied.

2. Bangladesh's many rivers offer convenient and environment-friendly transportation options. Based on this, private firms can build and operate new ports and terminals, rehabilitate and expand existing ports and terminals and develop surrounding land in the inland water transportation sector.

3. Dredging and/or land reclamation have attracted the most interest from private sector operators among all the PPP project groups. BIWTA is currently developing a master plan for the sector that envisages seven-year-performance-based contracts for dredging.

4. In water supply and sewerage services, a private operator can design, build, finance, operate and maintain the wastewater treatment plant. Also, WASAs may contract with private parties to provide wastewater treatment services by private plants or commercial effluent producers such as garment factories may pay for services from privately financed central effluent treatment facilities.

5. Finally, embankments for flood mitigation are viable as PPPs when developed with a tolled road on top of the embankment (or dyke) which attracts the private sector financing.

Considering both Environment, CCA and CCM, the following priority sectors may be selected for implementation of PPPs, which also coincides with the thematic area of SAP ECC:

Table 5.1: Priority areas for private sector engagement in the ECC sector

Priority Areas	Thematic Area of SAP	Strategies for Action
Land reclamation. Dredging of rivers, canals, wetlands, lakes and other related facilities	Blue Economy	1. Sustainable and Integrated Water Resources Management aligned with BDP2100 and SDGs considering adversities of climate change 2. Turn 'Blue' into 'Resources' and it's wise Harness 3. Establish a policy framework for unlocking the potentials of the blue economy 4. Ensure conservation and sustainable use of the coast and marine resources
Gender mainstreaming, social inclusion and community-based business model related projects	Local Level Climate Change Adaptation and Resilient Infrastructures	1. Promote initiatives to enhance climate resilience of communities among cross-cutting sectors and different levels 2. Integrating climate change adaptation into local level development planning 3. Ensure participation of women, marginalized groups in climate-resilient development and decision-making process 4. Integration of community and their local knowledge for sustainable climate-resilient environment management 5. Development of climate-resilient infrastructures and cities 6. Promote adaptive and flexible structural interventions to tackle deep uncertainties of climate change 7. Mainstream and Scaling up Nature-based-Solutions (NbS) for Climate Change Adaptation
Social infrastructure, e.g. health, education, human resource development, research and development and culture	Food Security, Social Protection and Health	1. Ensure increased agricultural productivity in the face of environmental problems and climate change adversities 2. Promote research and extension of stress-tolerant varieties or species 3. Massive expansion of climate-smart agriculture practices 4. Promotion of agricultural diversification and expansion of horticultural crops 5.Crop zoning, land use planning and promotion of precision agriculture 6. Ensure food and nutrition security, social safety net and good health against the negative impact of climate change and unexpected pandemics like COVID19

Priority Areas	Thematic Area of SAP	Strategies for Action
Conservation, livelihood improvement and community-based management projects	Forests, Ecosystem and Biodiversity	1. Ensure conservation and sustainable management of Forests, Ecosystem and Biodiversity 2. Encourage wise use of wetlands and introduce and integrate 'Payment for Ecosystem Services' in development planning 3. Ensure wildlife conservation and its habitat 4. Promote pro-forestation along with afforestation for conservation of forest, ecosystem and biodiversity
Environmental, industrial and solid waste management and pollution control projects	Pollution Control	1. Improvement of pollution control mechanism in Bangladesh 2. Ensure Beneficiary Pays Principle 3. Ensure strict enforcement of the 'Polluter Pay' principle 4. Development of improved waste (solid, liquid, e-waste, medical, chemical/hazardous etc.) management system 5. Introduce and encourage 4R and bio-initiatives for waste management to turn 'waste' into 'energy.'
Urban, municipal and rural project that government view as priority areas	Urban Environment Management	1. Ensure sustainable management of urban environment considering climate change and other environmental degradation 2. Integrate Low Impact Development (LID) or Best Management Practices (BMP) for urban environment development and management 3. Increase green areas and biodiversity in urban areas 4. Ensure conservation and protection of urban wetlands and ecosystem
Expansion of renewable energy-based industry, reduction of carbon emission and green growth	Green Growth and Low Carbon Development	1. Reducing carbon emission through introducing innovative low carbon technologies, pro-forestation, afforestation and increased use of renewable energy 2. Introduce and promotion of low carbon development and green infrastructures 3. Promotion of investment for Nature-based-Solutions (NbS) to accelerate green growth

The selection of the right private sector partner is one of the critical issues in PPP projects. A private sector that can make the investment worthy and sustainable is required in PPP projects. Against this backdrop, some criteria's have been mentioned below while selecting a private sector for PPP project-

- Whether for-profit or not-for-profit, any private sector should be legally registered in Bangladesh or abroad when submitting proposals in response to Request for Qualification or unsolicited submissions.
- At the contract award, the foreign entity must be registered as a legal entity in Bangladesh.
- The private sector has design and construction quality control schemes, project management skills, operation and maintenance policy.
- The private sector should have the ability to address the commercial risk (e.g., supply and demand risk) and sound financial analysis.
- The private sector seeks facilitation and technical assistance from experts, such as the ADB and the WB.
- The private sector should have a robust mechanism for ensuring accountability, transparency and participation in doing the assigned work.

iii) Engagement Modalities:

Engagement through Public-Private-Partnership (PPP)

The participation of the private sector through PPP is considered an essential route to reduce the investment deficit to achieve the goal of Vision 2021. The GoB, through its FY 2009-10 national budget, has first introduced the PPP concept and made a significant fund allocation for PPP projects to date.

The PPP projects are designed to provide services to citizens, enabling the government to provide services while providing the requisite financial returns to the private sector. PPP projects minimize the risks through their sharing nature between the public and private parties. In PPP projects, the government provides support through systems and frameworks. The private sector offers the efficiency, expertise, experience, innovation and quality of its work to help the public sector meet its provision. In this way, the whole process of the PPP project execution is divided between the parties. Risks are minimized to a great extent in PPP projects.

There are different models and approaches for PPPs, but the following are the standard model-

Build-Own-Operate (BOO): In this model, the private sector manages the infrastructure on a build-own-operate basis. The government usually does not manage the infrastructure developed under this model. The Independent Power Producer (IPP) is an example of the BOO model in Bangladesh.

Build-Operate-Transfer (BOT): Here, the private sector manages the infrastructure on a build-operate-transfer basis until a specified time, after which the government is responsible for its management.

Build-Own-Operate-Transfer (BOOT): Under this model, the ownership and management belong to the private sector until a specified time, and after the expiry of them, ownership and management are transferred to the government.

Design-Build-Finance-Operate-Maintain (DBFOM): This model has been adopted in BDP2100 to attract private finance in selected 7 projects where the private company will be responsible for financing, building and operating a facility to provide services to users. Among the most widely used PPP models, the DBFOM model is the only one that mobilizes private financing for greenfield facilities. The DBFOM structure also provides incentives to ensure proper operations and maintenance.

Engagement through National or International Fund Facilities

Many international climate funds like GCF or GEF or LDCF and development funds of UNDP, World Bank and ADB have their mechanism to engage the private sector like the Private Sector Facility of GCF. Private agencies can start their engagement by following required steps with the GCF through the Private Sector Facility (PSF), specifically established to engage the local and global private sector to support climate change mitigation and adaptation projects in developing countries.

As a developing country, Bangladeshi businesses or the private sector can access the GCF in two ways: direct access to GCF funding by seeking accreditation as a NIE that needs a robust institutional framework and experiences or accessing the GCF through existing and potential accredited entities. The private sector of Bangladesh can access GCF funding through accredited MIE, NIE or RIE by demonstrating how their project is aligned with the GCF's strategic focus areas and contribute to the fund's investment criteria. The GCF secretariat had accredited around 33 entities worldwide to access the funds. Besides, Clean Development Mechanism (CDM) also involves the private sector in its project development. Consultants are often employed to help identify and design potential CDM projects and prepare the necessary project documentation, particularly regarding emissions qualification and the development of baseline and monitoring methodologies. Furthermore, a range of private-sector carbon funds has been established in recent years. The examples include the Greenhouse Gas Credit Aggregation Pool (GG-CAP), the Japan Carbon Fund, Climate Investment Partnership, ICECAP and many others. These programmes generally target CDM projects that provide their clients with cost-effective emission reduction.

Private agencies can also collect funds from Bangladesh Climate Change Trust Fund (BCCTF) by following similar steps to GCF PSF, which requires a solid institutional background, experience and auditory framework.

iv) Monitoring, Evaluation and Coordination

The risks that the private sector finds while investing in CC projects are following-

- Climate change projects are typically longer. Climate relevant investments in low-income markets are often considered long term, higher risk and generating a lower financial return. Due to this risk associated with climate change investments, commercial investors are usually less willing to spend time, build relationships and market demand required to a decent return, requiring more 'patient' or 'concessional' forms of capital instead.
- The procedures to access public finance in some actors can be a bit "bureaucratic, stringent and cumbersome", which private sectors find discouraging and risky.
- Lack of insurance coverage in climate change investments. The absence of insurance stunts development because smallholders cannot risk investing in fixed capital or concentrating on profitable activities and crops for fear of losing them and falling into debt.

The challenges that the private sector face while investing in CC projects are following-

- Lack of capacity to evaluate projects and technical knowledge is one of the main constraints/or challenges in private sector engagement in climate change projects.
- Lack of access to the appropriate form of finance delivered through appropriate mechanisms is another major challenge. For example, targeting low-income communities through climate change responses will require innovative products and funding mechanisms currently lacking.
- The uncertainty about the impact of climate change, the existence of global businesses, and the difficulty or reluctance of managers to plan 20-30 years is also a challenge and reason that most companies are well aware of the risks posed by climate change adaptation. Still, only a few of them assess the risk and implement actions to tackle them.
- The limited flow of bankable projects in clean infrastructures such as renewable energy or low carbon transport is one of the biggest challenges that infrastructure investors face.

Some suggestions for the implementation, management, monitoring and evaluation of PPP projects are given below-

- There is a need for the private party engaging in PPP must agree on the engagement modalities for the government and private sector based on mutual interests, management roles, exit strategy, etc., to prevail in a win-win situation.
- The systemic and governance issues like participation, transparency, accountability etc., need to be sorted out.
- There must be a balance in power and control for the government and the private sector in PPP to ensure the country's interests.
- From the beginning, the priorities must be considered in planning, decision making, management and policymaking.
- For the implementation of PPP projects, the government should delegate more responsibility to the private sector.
- The management of PPP projects should be balanced through participation by the government and the private sector
- In all the steps of PPP, the management decisions need to be participatory and transparent.
- The private sector should be given enough freedom to operate independently and there should not be any hindrance or influence from any party in project implementation.

- There is a need to monitor and evaluate the impact on revenue generation, quality of customer services and long-term results in monitoring and evaluation for PPP, among other things.
- The entrepreneurial development, ownership, and operations of the related assets should be encouraged.

Environment, Climate Change and Disaster Statistics (ECCDS) Cell

Statistics and Informatics Division (SID), Ministry of Planning has established the "Environment, Climate Change and Disaster Statistics (ECCDS) Cell" in BBS as an initiative of institutionalization of the system. Focal Point Officer (FPO) and Staffs for ECDS Cell, responsible for communication and coordination with relevant Ministries/ Divisions/ Departments/ Organizations and Development Partners (DPs) for developing "Environment, Natural Resources, Bio-diversity, Climate Disaster and Disaster-related Statistics" have been appointed. SID also has made a "National Committee (Inter-Ministerial Technical Working Committee)" for collecting, compiling and disseminating the Environmental Statistics that the Director-General of BBS chairs. Now BBS is working in close cooperation with 28 relevant stakeholders Ministries/ Divisions/ Departments/ Organizations active in environmental statistics and resource accounts to strengthen BBS capacity building.

ECCDS Cell, BBS has prepared and published the "Bangladesh Environmental Statistics Framework (BESF) 2016-2030" under the guidance of United Nations Development of Environment Statistics Framework (UNFDES), United Nations System of Environmental-Economic Accounting (UN-SEEA), Sendai Framework for Disaster Risk Reduction (SFDRR) and other related frameworks. The BESF is a guideline, strategic action plan and integrated platform for collecting, analyzing, sharing, reporting and supporting the concerned indicators of Sustainable Development Goals (SDGs), SFDRR, Five Year Plan and other successive steps plans of Bangladesh. It has aligned all required monitoring and reporting against international and regional initiatives and commitments more effectively and is not burdensome to Bangladesh's national statistical system.

CHAPTER 6

Monitoring and Evaluation Framework for SAP ECC

A monitoring and evaluation framework has been prepared following SMART (Specific, Measurable, Achievable, Relevant and Time-bound) indicators and has been synchronized with the project list according to themes. The framework will use in total 115 unique indicators. The indicators have been carefully selected to ensure data availability. Among 115 indicators, only 13 do not have base year data. So, these indicators will need data collection for the base year, set the future targets and monitoring through responsible agencies. The missing data can be collected through the ECCDS cell framework of BBS. At the same time, updates of the marks will be taken care of by the Monitoring and Evaluation Cell of the proposed institutional framework for SAP ECC. In another way, the SDG tracking initiative can fill the data gap in the selected SDG indicators where BBS has been assigned already as a National Survey Organization to collect, store, and monitor those data. The chosen indicator set includes SDG indicators, national priority indicators (NPI), Bangladesh Delta Plan 2100 indicators from perspective plan 2041, indicators from the 8th Five Year Plan and indicators from Annual Performance Agreement (APA) from relevant agencies/ministries. This demonstrates the careful synchronization of the selected indicator set with other national and international M&E frameworks and guidelines already in use in the government institutions in Bangladesh. The following Table presents the different indicators required for various themes and strategies/ programmes and responsible agency/ data sources. A detailed version of this table, including the base year situation and SAP-ECC targets, is attached in Annex 4 in a result-based framework.

The proposed Coordination framework will be used to ensure regular monitoring and implementation of the framework. As a part of the coordination activity, the overall Measurement, Reporting and Verification (MRV) system will be implemented following the proposed results-based monitoring framework. This coordination will be led by the National Environment and Climate Change Unit (NECCU) formed by MoEFCC and GED. Several ministries/ agencies will be involved in this overall coordination. GED, MoF and ERD will lead the M&E. The project planning, selection and management will be organized by GED, PD, IMED, MoEFCC, DoE and BCCT. Besides coordination, data collection and tracking the progress against the targets are significant to ensure the effectiveness of the SMART indicators. So, the coordination team will ensure the timely monitoring and data collection of all indicators through the responsible agencies and establish mechanisms to start the collection of data for the new indicators. The coordination team will have to develop liaisons with engaged stakeholders of the Environment, Climate Change and Disaster Statistics (ESDS) Cell to collect and share data and information of relevant indicators proposed in the result-based framework of this SAP. Apart from monitoring by the coordination team at the system level, responsible agencies will be required to track the indicators and reflect the status against the targets in their annual performance agreement on their own. This will make the framework institutionalized in the government M&E system.

Bangladesh has already progressed in approaching a result-based monitoring framework by adapting the Climate Fiscal Framework (CFF) and preparing the Climate Investment Flow Tracking Mechanism. CFF was adopted for Bangladesh in 2014 to provide incentives and guidance for prioritized climate actions. It is a framework designed to ensure that internal and external financial resources are used economically, efficiently and effectively to address the issue of climate change. It establishes a transparent and sustainable approach to track and verify climate

finance utilization. The CFF provides principles and tools for climate fiscal policy-making, helping to identify the demand and supply sides of climate funds. In 2018, GoB also prepared Climate Investment Flow Tracking Mechanism through MoF. This new methodology was done following an extensive review of the OECD Rio Markers, relevant policies, plans, strategies and consultation with the key stakeholders. Moreover, the methodology has already been embedded in Finance Division's IT Platform iBAS++ to make it operational. Tracking the progress of climate investments is thus recommended further as an external monitoring tool framed through the adopted Climate Fiscal Framework (CFF) in 2014 to use internal and external resources economically, efficiently and effectively to address the environment and climate change.

Table 6.1: Identified SMART Indicators for SAP ECC Monitoring

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Responsible Agencies/data Source
Local Level Climate Change Adaptation and Resilient Infrastructures	Promote initiatives to enhance climate resilience of communities among cross-cutting sectors and different levels	Loss and damages due to climate change-induced disasters will be reduced	Reduce the number of deaths, missing persons and directly affected persons attributed to disasters to 1500 per 100,000 population (SDG Indicator 13.1.1, NPI 32)	Number	DDM, MoDMR, BDRHS, BBS, SID
		Ecosystem-based adaptation at the local level will be promoted	EbA & CbA approaches embedded in critical planning and policy documents	Number of Projects per FYP	PC, DoE, IMED
		A climate-resilient market system will be developed	The proportion of small-scale industries with a loan or line of credit (SDG Indicator 9.3.2)	%	SMI, BBS, SID
		Alternative income-generating activities will be increased, leading to enhance resilience against tackling disasters	Reduce the ratio of income of top 10% population and bottom 10% population to 20	Ratio	BBS, SID
	Integrating climate change adaptation into local level development planning	Climate-resilient social services facilities will be ensured	The proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management(SDG Indicator 6.b.1)	%	DPHE, LGD
		Private sector investment will be increased for local-level adaptation	The proportion of small-scale industries with a loan or line of credit (SDG Indicator9.3.2)	%	SMI, BBS, SID
	Ensure participation of women, marginalized groups in climate-resilient development and decision-making process	Gender-sensitive planning and programmes will be introduced	Adopt and strengthen sound policies and enforceable legislation to promote gender equality and the empowerment of all women and girls at all levels (SDG indicator 5c)	Number	FD. MoWCA
			Increase the female labour force participation rate to 50% (NPI16)	%	BBS, SID
		The leadership of women and marginalized groups in ECC development planning will be visible	The proportion of women in managerial positions (SDG Indicator 5.5.2)	%	QLFS, BBS, SID
		The social disparity will be reduced	The proportion of countries with systems to track and make public allocations for gender equality and women's empowerment(SDG Indicator 5.c.1)	Qualitative	FD ,MoWCA
			Increase the female labour force participation rate to 50% (NPI 16)	%	BBS, SID

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Responsible Agencies/data Source
	Integration of community and their local knowledge for sustainable climate-resilient environment management	Participatory and community-based management of the ECC sector will be ensured	Number of rural communities with disaster-resilient habitats and communities' assets	Number/ year	DDM, BWDB, BBS, SID
		Integration of indigenous knowledge into development planning will be ensured	Formation of the water management group	Number	BWDB
		Social conflicts will be reduced	Complaints settled within the stipulated time	%	DOE, WARPO
	Integrating climate change in the design and development of infrastructures Development of climate-resilient infrastructures and cities	Waterlogging and drainage congestion will be reduced	Small river, canal and water storage excavation	Sum	BWDB
			Waterlogging free area	%	BDP2100, BWDB, BBS
			Waterlogging free people	Number in Millions	BWDB, BBS, CEGIS, IWM, BDP2100
			Repair/ increase of height of the coastal embankment	km	BWDB
		Loss and damages due to climate change-induced disasters will be reduced	Catastrophic flood affected area	% of Bangladesh	BWDB, BBS, CEGIS, IWM, BDP2100
			Storm surge affected area	% of Coastal Zone	BWDB, BBS, CEGIS, IWM, BDP2100
			Dry season salinity intrusion free area	% of Coastal Zone	BWDB, BBS, CEGIS, IWM, BDP2100
			Flood vulnerable people	Number in Millions	BWDB, BBS, CEGIS, IWM, BDP2101, DDM
			Cyclone vulnerable people	Number in Millions	BWDB, BBS, CEGIS, IWM, BDP2102, DDM
			Erosion vulnerable people	Number in Millions	BWDB, BBS, CEGIS, IWM, BDP2103, DDM
			Reduce the number of deaths, missing persons and directly affected persons attributed to disasters to 1500 per 100,000 population (SDG Indicator 13.1.1, NPI 32)	Number	NPI ((1) DDM, MoDMR (2) BDRHS, BBS, SID

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Responsible Agencies/data Source
		Reduction of carbon emission will be ensured as committed by NDC	Converting Conventional Brick kiln to advanced technology	%	DOE. BFD, MoEFCC, MoPMER, MoI, MoC
			Campaign /Mobile court against contaminating Brick kiln	Number	DOE
			Reduce black carbon emission	%	DOE, SLCP Plan
			Reduction of emission replacing conventional brick kilns with the modern one	%	DOE, SLCP Plan, BFD, MoEFCC, MoPMER
			Reduction of emission replacing rice parboiling units with an improved one	%	DOE, SLCP Plan
			Less usage of Ozone depleting substances	Ton	DOE
	Promote Adaptive and flexible structural interventions to tackle deep uncertainties of climate change integrating nature-based elements	Optimum capital investment will be ensured	Funding in projects according to BCCSAP/SDG/ other planning	%	BCCT
		Recurrent costs for periodic maintenance will be reduced, and savings can be reutilized in other required investment	Monitoring in existing projects with funding from CCTF	Number	BCCT
			Evaluation of finished projects by CCT	%	BCCT
		Climate-resilient economic growth will be ensured	The total amount of funding for developing countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies (SDG Indicator17.7.1)		ERD
	Mainstream and scaling up of Nature-based Solutions for Climate Change Adaptation	Green growth development will be introduced and enhanced	Tree Plantation in coastal areas	Sum	BWDB, BFD
		Carbon emission will be reduced	Less usage of Ozone depleting substances	Ton	DOE
	Introduce and promotion of low carbon development and green infrastructures	Promoting nature-based solutions or hybrid structures (mixed of green and grey design)	Installed renewable energy-generating capacity in developing countries (in watts per capita) (SDG Indicator 7.b.1)	watts per capita	SREDA, Power Division
		Increased use of renewable energy day to day activities will be achieved	Renewable energy share in the total final energy consumption (SDG Indicator 7.2.1)	%	SREDA, Power Division
		Increased revenue from the tourism sector	Number of Tourist	Lakh (Number)	FD

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Responsible Agencies/data Source
	Promotion of investment for Nature-based-Solutions (NbS) to accelerate green growth	Green growth development will be introduced and enhanced	Tree Plantation in coastal areas	Sum	BWDB, BFD
		Carbon emission will be reduced	Less usage of Ozon depleting substances	Ton	DOE
	Reducing carbon emission through introducing innovative low carbon technologies, pro-forestation, afforestation and increased use of renewable energy	Reduction of carbon emission as per NDC commitment and carbon sequestration	CO2 emissions reduction	%	DoE, BFD, MoEFCC, MoPMER, MoRTB, MoI, MoC, LGD
			Reforested area	Ha	FD, MoEFCC, DoE, MoI, MoC, LGD, MoPMER, MoRTB, MoJT
			Afforested area	Ha	FD, MoEFCC, DoE, MoI, MoC, LGD, MoPMER, MoRTB, MoJT
Urban Environment Management	Ensure sustainable management of urban environment considering climate change and other environmental degradation	Protection and conservation of urban wetlands and ecosystems will be ensured	Industrial liquid waste discharge plan approval	Number	DOE
			Percentage of wetland and natural sanctuaries maintained	%	DBHWD
		Water supply, sanitation and hygiene services will be ensured in a sustainable manner	The proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water (SDG Indicator6.2.1)	%	MICS, BBS, SID ,PHC, BBS, SID, SVRS, BBS, SID
			Ensure 100% population using safely managed drinking water services (SDG Indicator 6.1.1, NPI 17)	%	MICS, BBS, SID
		Citizen awareness will be build-up for waste management	Campaign against polluters	Number	DOE
		Introduction of 4R strategy or IT-based monitoring of waste as well as environment management	Effluent Treatment Plant (ETP) Coverage to control industrial pollution	%	DOE

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Responsible Agencies/data Source
	Integrate Low Impact Development (LID) Best Management Practices (BMP) for urban environment development and management	Nature-based solutions will be promoted	The total area under wetlands restoration projects (completed)		FD, DBHWD, DoE
		Carbon emission will be reduced	Converting Orthodox Brick kiln to advanced technology	%	DOE
			CO2 emissions reduction	%	NPI. DoE, BFD, MoEFCC, MoPMER, MoRTB, MoI, MoC, LGD
			less usage of Ozon depleting substances	Ton	DOE
		Stormwater drainage and quality control will be ensured	Quality of groundwater and Surface water monitored at specific locations	Number	DOE, BWDB
			Zero liquid discharge plan approval	Number	DOE
	Integrate green areas and biodiversity in urban areas	Green area will be increased, and air pollution will be decreased, carbon emission and heat island effect will be reduced	Green Area Density	Sqm/ millions of people	DoE, City Corporations
			CO2 emissions reduction	%	NPI. DoE, BFD, MoEFCC, MoPMER, MoRTB, MoI, MoC, LGD
			Monitoring of Air Quality Index (AQI)	%day	DOE
	Ensure Conservation and protection of Urban Wetlands and Ecosystem	Urban water quality will be improved, and biodiversity will be maintained	Urban waterbodies compliance with water quality standards	%	DoE, City Corporations, WASAs, City Development Authority
			Measurement of bird species	Number	FD, BFRI

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Responsible Agencies/data Source
Pollution Control	Improvement of Pollution Control Mechanism in Bangladesh	Environmental quality (Environmental Quality Index, EQI) of the country will be improved	Monitoring of Air Quality Index (AQI)	% day	DOE
			Industrial liquid waste discharge plan approval	Number	DOE
			Less usage of Ozon depleting substances	Ton	DOE
		The Life of River will be saved	Industrial liquid waste discharge plan approval	Number	DOE
			Surface water polluted by industrial waste	% of the total river area	BWDB, DOE, MoI
			Effluent Treatment Plant (ETP) Coverage to control industrial pollution.	Sum	DOE
		Citizen and corporate awareness will be built up for pollution control	Trained family	Number/ Year	DOE
			Publication of research/guidelines/reports on climate change	Number	DOE
	Ensure Beneficiary Pay Principle and strict enforcement of 'Polluter Pay' principle	Application of polluter pay principles	% of cases	%	DoE, GED,
		Private entities will reduce environmental pollution measures	Campaign against polluters	Number	DOE
	Introduce and encourage 4R and bio-initiatives for waste management to turn 'waste' into 'energy.' Development of improved waste (solid, liquid, e-waste, medical, chemical/hazardous etc.) management system	Bio-safety will be ensured	plant species assessed for identification of endangered plant species	Number	BNH
			New plant discovered/Record	Number	BNH
		Introduction of 4R strategy or IT-based monitoring of waste as well as environment management	Effluent Treatment Plant (ETP) Coverage to control industrial pollution	%	DOE
		Improved waste management system	Urban centres with wastewater treatment facilities	%	DoE, City Corporation, WASAs, MoI

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Responsible Agencies/data Source
Blue Economy	Sustainable and Integrated Water Resources Management aligned with BDP2100 and SDGs considering adversities of climate change	Ensure water security and governance considering uncertainties of climate change	Ensure 100% population using safely managed drinking water services (SDG Indicator 6.1.1, NPI 17)	%	MICS, BBS, SID
		Resources optimization will be ensured through integrated land and water management	Coordination meeting between ministry and project director in a year organized by CCT	Number	BCCT
		Wise use and management of water resources for livelihood generation will be possible	Preparation of site-specific Plan (SSP)	Number	FD
	Turn 'Blue' into 'Resources', and it's wise Harness	Blue economy activity will be accelerated	Water quality monitoring of Bay of Bengal	Number	DOE, MoS, MoEFCC, Coast Guard, Concerned District Administration, Bangladesh Navy
			Hatchery of tortoises established in saint martin's island	Number	DOE
		Conservation of the marine ecosystem and biodiversity resources will be ensured The contribution of GDP from Blue Economy will be increased	Afforested coastal areas	ha	FD
			The amount of Boro kaytta fish hatched	Number	DoF
			Area of marine habitat	ha	DBHWD, IUCN, BWBD, DoF
			Country's Gross value addition from Blue Economy	%	BBS PC,BWDB, MoS, IMED
	Establish a policy framework for unlocking the potentials of the blue economy Ensure conservation and sustainable use of the coast and marine resources	Blue economy activity will be accelerated	Water quality monitoring of Bay of Bengal	Number	DOE, MoS, MoEFCC, Coast Guard, Concerned District Administration, Bangladesh Navy
			Hatchery of tortoises established in saint martin's island	Number	DOE
		The contribution of GDP from Blue Economy will be increased	Country's Gross value addition from Blue Economy	%	BBSPC,BWDB, MoS, IMED

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Responsible Agencies/data Source
Forests, Ecosystem and Biodiversity	Ensure Conservation and Sustainable Management of Forests, Ecosystem and Biodiversity	Protection and conservation of forests, ecosystems and biodiversity will be ensured	Conservation of extinct trees	Number	BFRI
			Area of forest management	ha	BFRI
			Garden creation and Management	ha	BFRI
		Conservation of the Sundarbans ecosystem will be ensured	Establishment of PSP for observing vegetation and regeneration in Sundarbans	Number	BFRI
			Management of mangrove arboretum established in Sundarbans	Ha	BFRI
			Minor mangrove forests production in Keora Forest in the coastal region	Ha	BFRI
			Minor mangrove plants production in Keora Forest in the coastal region	Number	BFRI
		Forest dependent alternative income generation activities will be increased, and livelihood will be improved	Number of consumers	Number	BNH
			Pulp production from Jigni/Nalita	Number	BFRI
		Wildlife crime will be reduced	Forest Animal Species	Number	BFRI, FD
			Measurement of bird species	Number	FD, BFRI
			Amount of smart patrolling	Km	FD
			Number of successful wildlife rescue operations	Number	FD

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Responsible Agencies/data Source
	Encourage wise use of wetlands and introduce and integrate 'Payment for Ecosystem Services' in development planning	Ensure wise use of wetlands as per Ramsar guidelines	Investigation Carried out based on the allegations received	%	DOE
			Small river, canal and water storage excavation	Sum	BWDB
		Promotion of PES schemes into development planning	Implementation of the project as per the inspection recommendations	Number	DOE
			Establishment of PSP for observing vegetation and regeneration in Sundarbans	Number	BFRI
	Ensure wildlife conservation and its habitat	Wildlife will be increased, and crime will be reduced	Amount of smart patrolling	Km	FD
			Number of successful wildlife rescue operations	Number	FD
	Promote pro-forestation along with afforestation for conservation of forest, ecosystem and biodiversity	Forest coverage will be increased, and carbon sequestration	CO2 emissions reduction	%	DoE, BFD, MoEFCC, MoPMER, MoRTB, MoI, MoC, LGD
			Amount of forest management	ha	BFRI
Food Security, Social Protection and Health	Ensure increased agricultural productivity, agricultural diversification in the face of environmental problems and climate change adversities Promotion of agricultural diversification and expansion of horticultural crops Promote research and extension of stress-tolerant varieties or species A massive expansion of climate-smart agriculture practice Crop zoning, land use planning and promotion of precision agriculture	Climate-smart agro-technologies and practices will be enhanced	The proportion of agricultural area under productive and sustainable agriculture (SDG Indicator 2.4.1)		ASC, BBS, SID, Agriculture Production Survey, BBS, SID
			Number of upgradations	Number	BNH
			New plant discovered/Record		BNH
		Promotion of urban agriculture to tackle the immediate crisis and enhance DRR response	Garden creation and Management	ha	BFRI

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Responsible Agencies/data Source
	Ensure food security, social safety net and good health against the negative impact of climate change and unexpected pandemics like COVID19 through expansion of climate-smart agriculture	Social safety and protection will be ensured	Disaster readiness	%	DDM, BBS, GED
			Reduce under-5 mortality rate to 25 per 1,000 live births (SDG Indicator 3.2.1, NPI 6)	Per 1000	SVRS, BBS, SID, PHC, BBS, SID
			Reduce the maternal mortality ratio to 70 per 100,000 live births (SDG Indicator 3.1.1, NPI 7)	Per 100,000	SVRS, BBS, SID, PHC, BBS, SID
		Immunity will be strengthened, and mortality will be reduced	Number of new HIV infections per 1,000 uninfected population, by sex, age and key people (SDG indicator 3.3.1)		NASP, DGHS, HSD, UNAIDS
			Tuberculosis incidence per 100,000 population (SDG Indicator 3.3.2)		HMSS, BBS, SID, NTP, DGHS, HSD, WHO
			Reduce the prevalence of stunting among children under 5 years of age to 12% (SDG Indicator 2.2.1, NPI 3)		MICS, BBS, SID
			Number of people requiring interventions against neglected tropical diseases (SDG Indicator 3.3.5)		CDC Unit, DGHS, HSD, WHO
Institutional Strengthening, Coordination and	Enhance collaboration among public, private sectors, GO/ NGO, Civil Societies and Academia	Collaboration among public and private sectors/NGO/CSO/Academia will be increased	Coordination meeting between ministry and project director in a year organized by CCT	Number	BCCT
			Monitoring in existing projects by CCT	Number	BCCT
		Knowledge and information generated from private sectors will be integrated into development planning and disseminated among private sectors	Organizing workshops on setting up high technology Brickfields at the division level for entrepreneurs	Number of entrepreneurs	DOE
		Enabling environment for private sector engagement in ECC investment will be ensured	The person/ Organization/entrepreneurs receiving the services	Number	DOE

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Responsible Agencies/data Source
	Ensure both vertical and horizontal coordination among ministries and agencies.	Multi-stakeholder participation will be ensured in holistic and integrated project planning, design, implementation and M&E process	Coordination meeting between ministry and project director in a year organized by CCT	Number	BCCT
		The gap in aligned sectors and overlapping issues in cross-cutting sectors will be reduced	Monthly coordination meeting organized by CCT	Number	BCCT
		Challenges due to overlapping jurisdiction will be addressed	Monthly coordination meeting organized by CCT	Number	BCCT
	Improvement of governance of environment and climate change through integrated and coordinated enforcement mechanism increased transparency and accountability	Transparency and accountability in the ECC sector will be ensured	Service delivery commitment update	%	DOE
		Increased efficiency in investment utilization	Implementation of the project as per the inspection recommendations	Number	DOE
			Service delivery commitment update	%	DOE
		Public Service quality will be improved and ensured	Introduction feedback monitoring system for service recipients		DOE
		Introduction of innovative techniques and technologies for the governance of ECC	Use of e-file in every division	%	DOE
			Launch a new digital service at a minimum	Number	DOE
		Grievance and dispute mechanisms will be improved	Complaints settled within the stipulated time	%	DOE
	Promote and ensure proper and effective use of enforcement tools and techniques	Citizen behaviour will be changed, and awareness will be raised to prevent pollution	Number of conscious beneficiaries	Number	FD
		Ethical behaviour will be promoted	Introduction feedback monitoring system for service recipients	Date	DOE
			Implementation of National Integrity Action Plan	%	DOE
		Protection and conservation of Ecologically critical or fragile areas will be ensured	Conservation activities adopted in the Environmentally critical area	Number	DOE

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Responsible Agencies/data Source
	Ensure availability and accessibility of climate finance in a sustainable way to facilitate investment for climate change adaptation and mitigation	A sustainable climate financing mechanism will be established	Government allowance for project funding in each year	%	BCCT
		Ease in the accessibility of funds will be ensured	Funding in projects according to BCCSAP/SDG/ other planning	%	BCCT, ERD as NDA, MoEFCC
		Knowledge and capacity regarding fund availability and accessibility will be increased, respectively	Savings from government allowance each year	%	BCCT
	Promote private sector engagement in climate financing along with public sector	The deficit of public funds for ECC investments will be reduced	The total annual value of climate finance received from the Private sector	%	
		Achievement of GDP as per BDP2100 will be facilitated	Increase annual growth rate of GDP to 10% (SDG Indicator 8.1.1, NPI 21)	%	NAW, BBS, SID
			Increase total government revenue as a proportion of GDP to 20% (SDG Indicator 17.1.1, NPI 38)	%	NBR, IRD, FD
	Enhance the use of ICT for knowledge, data and information sharing	Knowledge management and access gets easier	Knowledge hub available to people	%	ICT, DoE, PC

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Responsible Agencies/data Source
Research Innovation and capacity development	Enhance institutional capacity and human skill development to mainstream climate change and environmental issues into the development planning and implementation process	Institutional capacity will be enhanced to plan, design, implement, O&M and M&E of ECC projections	Publication of research/guidelines/ reports on climate change	Number	DOE
			Assist in the transfer of energy-efficient technologies to combat climate change	Number	BCCT
		The skill of human resources will be developed	Number of officers sent for training to increase the human resources capacity	Number	DOE, BCCT
			Per capita training hour	Hour	BCCT
		Leadership among young officials and professionals will be developed	Number of officers sent for training to increase the human resources capacity of the DOE	Number	DOE
	Encourage innovative research and knowledge management to bridge the lesson learned with emerging developments	The gap in knowledge generation in academia or action research and implementation or project planning and development will be reduced	Floristic Publication	Number	BNH
			Published Flora of Bangladesh series.	Number	BNH
		Knowledge and information generated from research and field level activities will be stored and managed properly	Publication of research/guidelines/reports on climate change	Number	DOE
		Field-based real-life problem solving or action research will be increased and encouraged	Research on the Increase of strength of reusable papers	Number	BFRI
			Research on the increasing life cycle of wood and bamboo variety	Number	BFRI
	Enhance opportunities for collaborative research with academia	Quality research will be increased	Publication of research/guidelines/ reports on climate change	Number	DOE

Annex 1: SDG Action Plan for ECC Aligned Targets

Action Plan of Ministry of Environment, Forests and Climate Change (MoEFCC)- formerly known as Ministry of Environment and Forests (MoEFCC) by targets in the implementation of SDGs aligning with 7th Five Year Plan and Beyond

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/ Targets related to SDG Targets and Indicators	Theme of SAP ECC
1	2	3	4	5	
Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters	1.5.1: Number of deaths, missing persons and persons affected by disaster per 100,000 people.	Lead Ministry MoEF (DoE) Co-Lead: MoDMR	MoHA;MoInf; PTD;MoE; MoEWOE; MoF;MoHFW; MoSW;MoFL, MoWR; LGD; MoLWA; MoWCA; BFID(BB); SID; MoA	• Increase the no. of usable cyclone shelters • Enhance post-disaster management and relief programmes agriculture and environment friendly, disaster-resilient and affordable. • Ensuring that the Social Security system supports an effective disaster response system	Local Level Climate Change Adaptation and Resilient Infrastructures Food Security, Social Protection and Health

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/Targets related to SDG Targets and Indicators	Theme of SAP ECC
1	2	3	4	5	
Target 1.5: By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters	1.5.1: Number of deaths, missing persons and persons affected by disaster per 100,000 people.	Lead Ministry MoEF (DoE) Co-Lead: MoDMR	MoHA;MoInf; PTD;MoE; MoEWOE; MoF;MoHFW; MoSW;MoFL, MoWR; LGD; MoLWA; MoWCA; BFID(BB); SID; MoA	• To minimize the climate impact, investment has to be made in developing new agricultural seeds that would be stress-tolerant and grow in such inclement conditions.	Local Level Climate Change Adaptation and Resilient Infrastructures Food Security, Social Protection and Health Institutional Strengthening, Coordination and Governance

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/Targets related to SDG Targets and Indicators	Theme of SAP ECC
				• More arsenic-free tube-wells have to be made available in high-level arsenic contamination areas for ensuring the safe health of the people • Besides the impact on agricultural production due to floods, short-term measures are needed to immediately help the victims of those disasters. • Increase investment and build more centres where the climate victims can take shelter. This will in turn, help any relief activity that would be taken after the disaster. • Priority should be given in drought-prone areas in terms of inputs (e.g. irrigation, etc.) for agriculture that would help them to tackle droughts. • Extension services to disseminate newly developed technologies and building materials which will be agriculture and environment friendly, disaster-resilient and affordable. • Ensuring that the Social Security system supports an effective disaster response system.	

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/Targets related to SDG Targets and Indicators	Theme of SAP ECC
Target: 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	Indicator3.9.1: Mortality rate attributed to household and ambient air pollution.	MoEF (DoE)	MoHFW; MoLE; SID	• Expanding air quality management activities, focusing on gross diesel polluters, and the extension of air quality monitoring to major cities. • Strict enforcement to control dust and other emissions at the construction site • Strict enforcement of Brick Kiln Act 2013 for phasing out of traditional brick Kiln. • Introduce cleaner fuel & transport standards to achieve environmental sustainability. • Facilitate greater investment in public mass transit options for cities.	Pollution Control
Target: 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.	Indicator 6.3.1: Proportion of wastewater safely treated Indicator 6.3.2: Proportion of bodies of water with good ambient water quality.	Lead ministry:LGD Co-Lead ministry: MoEF (DoE)	MoInd; MoFA; MoTJ; MoF; MoWR; MoS	• Urban areas need integrated water treatment and efficient water supply facilities. • Shifting the dependence on water supply from groundwater to surface water with improvement in surface water quality. • Construction, operation and maintenance of water treatment plants, water abstraction facilities and water distribution systems for providing drinking water to the public, industries and commercial organizations,	Pollution Control Blue Economy Urban Environment Management

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/Targets related to SDG Targets and Indicators	Theme of SAP ECC
12.2:By 2030, achieve the sustainable management and efficient use of natural resources.	Indicator 12.2.2: Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP	Ditto	Ditto	• Ensure proper waste management system in place for good environmental health economic development • Strengthen forestry extension activities to transfer improved technology and research information to end-users, e.g., local people and private homesteads • Conserve non-renewable resources and sustaining auto and eco-generation of renewable resources. • Preserve, protect and develop the natural resource base	Local Level Climate Change Adaptation and Resilient Infrastructures Urban Environment Management Pollution Control Green Growth and Low Carbon Development Forest, Ecosystem and Biodiversity
12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, following agreed international frameworks, and significantly reduce their release to air, water and soil to minimize their adverse impacts on human health and the environment.	12.4.1: Number of parties to international multilateral environmental agreements on hazardous waste and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement. 12.4.2: Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment.	Lead Ministry: MoEF (DoE) Lead Ministry: LGD Co-Lead Ministry: MoEF (DoE) 2	Associate ministry: LGD; MoA; MoInd; MoHFW; MoTJ Associate ministry: MoInd; MoST; MoHFW		Pollution Control

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/Targets related to SDG Targets and Indicators	Theme of SAP ECC
Target 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.	13.3.1: Number of countries that have integrated mitigation, adaptation, impact reduction and early warning into primary, secondary and tertiary curricula.	Lead Ministry: MoEF (DoE+BCCT) Co-Lead Ministry: MoDMR	MoE; MoPME; MoHA; MoInf; MoInd (BIM); MoD; LGD	• Design skill-focused training for resilient agriculture, industry, infrastructure, trade and other fields on principles of practical resilience. • Initiate research to understand how resilience principles could be used to improve education at different levels in Bangladesh. • Mainstream poverty-environment-climate-disaster nexus in the project design phase, budgetary process, project implementation and monitoring process.	Research, Innovation and Capacity Development Institutional Strengthening, Coordination and Governance Green Growth and Low Carbon Development Food Security, Social Protection and Health Urban Environment Management
	13.3.2: Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions.	Ditto	Ditto	• Ensure effective environmental management activities by allowing inclusive, bottom-up participation in adaptation decision making, especially at the community level • Promote participatory, community-based environmental resource management and environmental protection (considering the access for the poor, equity, as well as gender issues) along with community-based adaptation	

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/Targets related to SDG Targets and Indicators	Theme of SAP ECC
13.a: Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly US$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible.	Indicator 13.a.1: The mobilized amount of United States dollars per year starting in 2020 accountable towards the US$100 billion commitment.	MoEF (MoEF+DoE)	ERD; MoFA; BFID; (BB)	• One of the key strategies of the Seventh Five Year Plan will be to ensure effective partnership with development partners to ensure better use and results of foreign assistance.	Institutional Strengthening, Coordination and Governance Green Growth and Low Carbon Development Research, Innovation and Capacity Development
Target 13.b: Promote mechanisms for raising capacity for effective climate change-related planning and management in the least developed countries and Small Island Developing States, including focusing on women, youth and local and marginalized communities.	13.b.1: Number of least developed countries and small island developing States that are receiving specialized support, and amount of support, including finance, technology and capacity-building, for mechanisms for raising capacities for effective climate change-related planning and management, including focusing on women, youth and local and marginalized communities.	Lead Ministry: MoEF (DoE+BCCT)	Associate Ministry: ERD; GED; MoInd	• Support from development partners may be sought to analyse potential NIEs and to enhance their respective capacities, including fiduciary capacities and practices.	Research, Innovation and Capacity Development Institutional Strengthening, Coordination and Governance

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/Targets related to SDG Targets and Indicators	Theme of SAP ECC
Target 14.3: Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels.	Indicator14.3.1: Average marine acidity (pH) measured at agreed suite of representative sampling stations	MoEF (DoE)	MoST; MoFL; MoFA; EMRD; MoS; MoInd; MoD	Blue Economy Action Plan	Blue Economy
Target 14.5: By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information.	Indicator 14.5.1 Coverage of protected areas in relation to marine areas	Lead Ministry: MoEF (DoE+ BFD+DoF) Co-Lead ministry: MoFL	MoD (BN); MoFA; MoHA; MoS	• Cox's Bazaar-Teknaf Peninsula (20,373 ha) • Sundarbans (10 km landward periphery) (292,926 ha) • St. Martin's Island (1,214 ha) • Sonadia Island (10,298 ha) • Swatch of No-Groubd (Bay of Bangal) (173,800 ha) • Marine Reserve (Bay of Bangal by DoF) (69,800 ha) • 5% of coastal and 1.34% of marine areas are targeted to be protected by 2020.	Blue Economy

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/Targets related to SDG Targets and Indicators	Theme of SAP ECC
Target 15.1: By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, particularly forests, wetlands, mountains and drylands, in line with obligations under international agreements.	15.1.1: Forest area as a proportion of the total land area.	MoEF (DoE+BFD)	MoA; MoCHTA; MoL; MoWR; MoFL; MoS	• Increase productive forest coverage to 20% by 2020. • 15% of land covered by forestry with 70% tree density • At least 15% of the wetland in peak dry season is protected as the aquatic sanctuary. • Restore 20,000 acres of denuded Chokoria –Sundarbans Reserve Forest	Blue Economy Forests, Ecosystem and Biodiversity
	15.1.2: Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type	Ditto	Ditto	• Maintaining the coastal polders is a major challenge while ensuring community-level climate sustainability is also essential. • Resolving social conflicts and disputes regarding community-level water management • Ensure effective environmental management activities by allowing inclusive, bottom-up participation in adaptation decision making, especially at the community level • Promote participatory, community-based environmental resource management and environmental protection.	Blue Economy Forests, Ecosystem and Biodiversity

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/Targets related to SDG Targets and Indicators	Theme of SAP ECC
Target 15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	Indicator 15.2.1: Progress towards sustainable forest management	Lead Ministry: MoEF FD+BFIDC)	Associate Ministry: MoL; LGD; CD; MoInf	• Strengthen forestry extension activities to transfer improved technology and research information to the end-users. • Conserve the Sundarbans Mangrove Forest (SMF) without any further deforestation and forest degradation. • Ensure no forest land shall be converted for non-forest use • Ensure no commercial plantation in protected forest areas where only native species can be used for enrichment and restoration purposes. • Creation of alternative livelihoods to lessen pressure on the SMF • Rivers and canals of the SMF will not be used for transporting goods and materials and other business purposes. • Enhance social forestry programmes • Ensure greater contribution of the forestry sector in the economic development	Forests, Ecosystem and Biodiversity

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/Targets related to SDG Targets and Indicators	Theme of SAP ECC
Target 15.3: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.	Indicator15.3.1: Proportion of land that is degraded over total land area.	Lead Ministry: MoEF +BFD+BFRI) Co-Lead ministry: MoL	MoA; MoWR; LGD, MoDMR	• Promote science-led agriculture technology systems and encourage research and adoption of modern agricultural practices for the development of drought, submergence and saline prone agriculture considering water and time economy, adaptation to climate change, proper use of genetically modified technology in agriculture, and promote adoption of modern agricultural practices in the dry land, wetland, hills and coastal areas including use of environmentally friendly green technologies (e.g. IPM, INM, AWD, etc.) and climate-smart/resilient technologies; • Introduce salinity, submergence and other stress-tolerant varieties, especially in the southern regions; • Establish a national drought monitoring system • Assessment of ecosystem degradation and mitigate impacts of drought in dryland Barindecosystem. • Conservation and manage watershed and soil	Urban Environment Management Local Level Climate Change Adaptation and Resilient Infrastructures Food Security, Social Protection and Health Research, Innovation and Capacity Development

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/Targets related to SDG Targets and Indicators	Theme of SAP ECC
Target 15.4: By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, to enhance their capacity to provide benefits that are essential for sustainable development	Indicator 15.4.1:Coverageby protected areas of important sites for mountain biodiversity	Lead Ministry :MoEF	Associate Ministry: MoA; MoCHTA; MoCAT; MoL; LGD	• Ensure the conservation of biodiversity and its sustainable utilization • Preserve, protect and develop the natural resource base • The new area will be brought under Tourism Protected Area	Forests, Ecosystem and Biodiversity Green Growth and Low Carbon Development
Target 15.5: Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	Indicator 15.5.1: Red List Index	Lead Ministry: MoEF	Associate Ministry: MoFL; MoA; MoInf	• The initiative will be undertaken to update NBSAP in line with the Aichi Biodiversity Targets and implement the NBSAP as global commitment. • Ensure integration of biodiversity into National Adaptation Plan (NAP) and nationally appropriate mitigation action (NAMA). • Assess and benefits sharing mechanisms will be established as well as Nagoya Protocol on ABS will be ratified with enactment of Bangladesh Biological Biodiversity Act. • National capacity will be built to address the research and development on genetic resources. • Create awareness and education on biodiversity. • Use indigenous and traditional knowledge on Biodiversity. • Stop and minimize ecosystem pollution from all sources.	Forests, Ecosystem and Biodiversity Green Growth and Low Carbon Development Research, Innovation and Capacity Development Institutional Strengthening, Coordination and Governance

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/Targets related to SDG Targets and Indicators	Theme of SAP ECC
Target 15.6: Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed	15.6.1: Number of countries that have adopted legislative, administrative and policy frameworks to ensure fair and equitable sharing of benefits	MoEF	MoA; MoFL MoST		Institutional Strengthening, Coordination and Governance
Target 15.7: Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products	Indicator 15.7.1: Proportion of traded wildlife that was poached or illicitly trafficked	Associate Ministry: LJD; MoFL; MoHA	Associate Ministry: LJD; MoFL; MoHA	• Undertake special protection measures to minimize the existing threats • Review IUCN Red list and other documents on the state of endangered and threatened species • Keep the Sundarbans' biophysical characteristics intact through all sorts of protective measures.	Forests, Ecosystem and Biodiversity Institutional Strengthening, Coordination and Governance
Target 15.8: By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.	15.8.1: Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien species.	MoEF	MoA; MoFL	• Ensure no commercial plantation in protected forest areas where only native species can be used for enrichment and restoration purposes. • Bangladesh Biological Diversity Act will be enacted as well as necessary rules will be framed.	Forests, Ecosystem and Biodiversity Institutional Strengthening, Coordination and Governance
Target 15.9: By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.	15.9.1: Progress towards national targets established following Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011-2020.	MoEF	GED; LGD; SID	• Value goods and services provided by ecosystem and biodiversity to integrate these values into the national accounting system. • Enhance PES with appropriate strategies and policies for poverty reduction • Updating of NBSAP	Forests, Ecosystem and Biodiversity Institutional Strengthening, Coordination and Governance Research, Innovation and Capacity Development

SDG Targets	Global Indicators for SDG Targets	Lead/Co-Lead Ministries/ Division	Associate Ministries/ Divisions	7th FYP Goals/Targets related to SDG Targets and Indicators	Theme of SAP ECC
Target: 15.c: Enhance global support for efforts to combat poaching and trafficking of protected species, including increasing local communities' capacity to pursue sustainable livelihood opportunities.	Indicator 15.c.1: Proportion of traded wildlife that was poached or illicitly trafficked.	MoEF (BFD)	LGD; MoHA; MoD	• Review IUCN Red list • Apply global commitments as a party to the United National Convention on Biological Diversity. • Bring new areas under forest coverage through social forestry. • Sustain and replicate community-based resource management. • Enhance reforestation and forest protection under carbon credit and REDD	Forests, Ecosystem and Biodiversity Institutional Strengthening, Coordination and Governance
Target 17.7: Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including concessional and preferential terms, as mutually agreed.	Indicator 17.7.1: Total amount of approved funding for developing countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies.	MoEF (DoE)	ERD; MoFA; MoST; MoInd; PMO (BOI); MoDMR; IRD	One of the key strategies of the Seventh Five Year Plan will be to ensure effective partnership with development partners along with NGOs, Multinational Companies so that greater technology transfer is facilitated. Environmentally sound, climate-smart and energy-efficient Technology transfer/ dissemination activities need to be strengthened in every sector like Agriculture, Water, Industry, forestry, and infrastructure.	Institutional Strengthening, Coordination and Governance

Annex 2: Synchronization of National and SDG Targets with SAP ECC

SAP ECC Theme	SAP ECC Strategy/Programme	National Targets	SDG Goal	SDG Targets
T1: Local Level Climate Change Adaptation and Resilient Infrastructures	1. Promote initiatives to enhance climate resilience of communities among cross-cutting sectors and different levels 2. Integrating climate change adaptation into local level development planning 3. Ensure participation of women, marginalized groups in climate-resilient development and decision-making process 4. Integration of community and their local knowledge for sustainable climate-resilient environment management 5. Development of climate-resilient infrastructures and cities 6. Promote adaptive and flexible structural interventions to tackle deep uncertainties of climate change 7. Mainstream and Scaling up Nature-based-Solutions (NbS) for Climate Change Adaptation	• 5 % reduction by the end of 2021 of the area flooded by rivers (CIP) • 8270 Km of embankments will be improved by 2021 (CIP) • Livelihood protection in ecologically fragile areas (BCCSAP) • Environmental, Climate Change and disaster risk reduction considerations are integrated into project design, budgetary allocations, and implementation. (BCCSAP) • Maple Craft's Climate change vulnerability index will be less than 1 by the end of 2021 (CIP) • Environment and Gender index will be 50 by the end of 2021. (CIP) • 75% of policies in EFCC will address gender issues by 2021 (CIP) • By 2021, Bangladesh will develop a Gender-responsive scorecard.(CIP) • By 2021, the number of women in EFCC organizations should be increased to 30% at the national and Divisional levels. (CIP)	SDG Goal 3, 5, 6, 9, 11, 13	• 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all • 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations • 6.b Support and strengthen the participation of local communities in improving water and sanitation management • 9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets • 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries • 13.2 Integrate climate change measures into national policies, strategies and planning • 5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life

SAP ECC Theme	SAP ECC Strategy/Programme	National Targets	SDG Goal	SDG Targets
		• Community-based disaster preparedness and improved resilience. (BCCSAP) • The country is equipped to respond fully and quickly to any incidence of natural. (PP2041) • By 2021 readiness/ preparedness index will increase to 0.35. (CIP) • Disaster Risk Reduction and Management Readiness 50% by 2025 (8th FYP) • Improvement of the existing flood forecasting and early warning systems by increasing lead times and strengthen dissemination mechanism. (BCCSAP) • Improvement in cyclone and storm surge warnings and dissemination. (BCCSAP) • Monitoring and modelling to predict the sea-level rise and its impacts. (BCCSAP) • Make existing cyclone shelters safe and functional. (BCCSAP) • Ensure continued flood protection by repairing and rehabilitating existing flood embankments. (BCCSAP) • Repair and reconstruct the existing polders in the coastal belt of Bangladesh. (BCCSAP)		• 5a. Undertake reforms to give women equal rights to economic resources and access to ownership and control over land and other forms of property, financial services, inheritance, and natural resources, in accordance with national laws. • 5c. Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels. • 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all • 9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities • 11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to the global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations • 3.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

SAP ECC Theme	SAP ECC Strategy/Programme	National Targets	SDG Goal	SDG Targets
T2: Green Growth and Low Carbon Development	1. Reducing carbon emission through introducing innovative low carbon technologies, pro-forestation, afforestation and increased use of renewable energy 2. Introduce and promotion of low carbon development and green infrastructures 3. Promotion of investment for Nature-based-Solutions (NbS) to accelerate green growth	• Consumption of ozone-depleting H-CFCx (Ozone depleting potential) will be reduced to 47.2 tons in 2021. (CIP) • By 2030, emissions from the power and energy sector will be reduced to 5-18%. (CIP) • 5% Carbon tax by 2025 (8th FYP) • 500-meter-wide permanent green belt was established and protected along the coast. (7FYP) • Ensure energy secure and low carbon development of the economy. (BCCSAP) • Enhance energy security and ensure low emission development. (BCCSAP) • Ensure livable cities while lowering GHG emissions. (BCCSAP) • Adaptation to climate change in the tourism sector. (BCCSAP) • Land zoning for sustainable land/water use completed. (7FYP) • Reduction of black carbon emissions by 40% in 2030. (SLCP) • Reduction of methane emissions by 17%. (SLCP) • 00% emission reduction from burning crops residues. (SLCP)	SDG Goal 7 SDG Goal 8	• 7.2 By 2030, increase the share of renewable energy in the global energy mix substantially • 7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology • 7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular, least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support • 8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products

SAP ECC Theme	SAP ECC Strategy/Programme	National Targets	SDG Goal	SDG Targets
		• Control of CH4 emission from livestock mainly through farm-scale anaerobic digestion of cattle and poultry manure will reduce 15% emission by 2040. (SLCP) • Elimination of open burning of MSW by landfills/composting, recycling will reduce emission by 100% in 2040. (SLCP) • Replace traditional biomass cookstoves with improved biomass cookstoves and reduce emission by 50%.by 2040. (SLCP) • 87% emission reduction by replacing traditional brick kilns with improved ones by 2040. (SLCP) • Replacing traditional rice parboiling units with improved ones will reduce 53% emission by 2040. (SLCP) • Elimination of high emitting vehicles. (SLCP) • Scale-up afforestation and reforestation. (BCCSAP) • Facilitating the formulation and advancement of NAP process through giving priorities in Nature-Based Solution (NBS) and Ecosystem-Based Adaptation (EbA) (8th FYP) • Lower emission from agricultural land. (BCCSAP)		

SAP ECC Theme	SAP ECC Strategy/Programme	National Targets	SDG Goal	SDG Targets
T3: Urban Environment Management	1. Ensure sustainable management of urban environment considering climate change and other environmental degradation 2. Integrate Low Impact Development (LID) or Best Management Practices (BMP) for urban environment development and management 3. Increase green areas and biodiversity in urban areas 4. Ensure conservation and protection of urban wetlands and ecosystem	• 100% Urban and 50% Rural households with tap water connectivity by 2041. (PP2041) • Green area for Dhaka cities increase to 1-4sq m/million by 2025 (8th FYP) • 50% of urban waterbodies comply with water quality standards by 2025 (8th FYP) • 100% Urban and 50% Rural households with water-sealed sanitary toilets by 2041. (PP2041) • 100% Urban and Rural households with modern/Safe sewerage connection by 2041. (PP2041) • Ensure protection of the environment by effectively meeting the challenges arising from climate change and preventing environmental degradation. (PP2021) • Cities are normally flood free with proper drainage, modern sewerage, proper waste management and clean air. (PP2041) • 45% of cities flood free and with proper drainage by 2025 (8th FYP) • 100% urban centres with wastewater treatment by 2041. (PP2041) • Establish/ expand sewerage system and establish municipal wastewater treatment plant in major urban centres. (SLCP)	SDG Goal 11	• 11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons • 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management • 11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities • 11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels • 11.c Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials

SAP ECC Theme	SAP ECC Strategy/Programme	National Targets	SDG Goal	SDG Targets
		• Prevent drainage congestion and waterlogging that may result from heavy rainfall in urban areas. (BCCSAP) • 50% of urban centres with wastewater treatment facilities by 2025 (8th FYP • Urban wetlands are restored and protected in line with Wetland Conservation Act. (7FYP) • At least 15% of the wetland in peak dry season is protected as the aquatic sanctuary. (7FYP) • Canals and natural water flows of Dhaka and other major cities were restored. (7FYP) • Inclusive urban planning based on sustainable land use planning and zoning. (7FYP)		
T4: Pollution Control	1. Improvement of pollution control mechanism in Bangladesh 2. Ensure Beneficiary Pays Principle 3. Ensure strict enforcement of the 'Polluter Pay' principle 4. Development of improved waste (solid, liquid, e-waste, medical, chemical/hazardous etc.) management system 5. Introduce and encourage 4R and bio-initiatives for waste management to turn 'waste' into 'energy'	• Air quality 10% (annual average, µg/m3 PM 2.5).(PP2041) -Air quality 50% (annual average, µg/m3 PM 2.5) by 2025 (8th FYP) • Improve air quality in Dhaka and other large cities and enact Clean Air Act).(7FYP) • Maple Croft's Climate change vulnerability index will be less than 1 by the end of 2021.(CIP) • Promote Zero discharge of industrial effluents. (7FYP) • By 2021, 64% of the produced waste will be disposed of in environmentally friendly landfills or controlled disposal sites in Dhaka. (CIP)	SDG Goal 6 and 12	• 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally • 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

SAP ECC Theme	SAP ECC Strategy/Programme	National Targets	SDG Goal	SDG Targets
				• 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment • 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse • 12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities
T5: Blue Economy	1. Sustainable and Integrated Water Resources Management aligned with BDP2100 and SDGs considering adversities of climate change 2. Turn 'Blue' into 'Resources', and it's wise Harness 3. Establish a policy framework for unlocking the potentials of the blue economy 4. Ensure conservation and sustainable use of the coast and marine resources	• Safe drinking water for all (7FYP) • 4 additional Tidal river management schemes will be developed by 2021. • Revive the network of rivers and khals	SDG Goal 6 and 14	• 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity • 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate • 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate • 14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution

SAP ECC Theme	SAP ECC Strategy/Programme	National Targets	SDG Goal	SDG Targets
				• 14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels • 14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information • 14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries
T6: Forest, Ecosystem and Biodiversity	1. Ensure conservation and sustainable management of Forests, Ecosystem and Biodiversity 2. Encourage wise use of wetlands and introduce and integrate 'Payment for Ecosystem Services' in development planning 3. Ensure wildlife conservation and its habitat 4. Promote pro-forestation along with afforestation for conservation of forest, ecosystem and biodiversity	• Protected forest area as a proportion of total land area will be increased to 15% by the end of 2021. (CIP) - Area under forest cover 15.2% by 2025 (8th FYP) -Bring 24% of the country's land under tree cover by the end of 2025 (8th FYP) • Encroachment area will be decreased by 2021. (CIP) -Protection of habitat and biodiversity international ranking Top 50% by 2025 (8th FYP) • By the end of 2021 total area under coastal afforestation will be 14900ha. (CIP)	SDG Goal 2, 6 and 15	• 6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes • 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements • 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

SAP ECC Theme	SAP ECC Strategy/Programme	National Targets	SDG Goal	SDG Targets
	• Area under forest cover will be 20% of total land by 2041. (PP2041) • Total employment in forestry will increase by 10% every year (of which 2% increase will be for women). (CIP) • Gross value added in forestry will be 1.86% of overall GDP. (CIP) • Aquaculture plan in place by 2021 and at least 5 projects under conservation objective initiated. (CIP) • Wildlife Protection (SMART patrolling in all PA and Combat transboundary wildlife crime) (8th FYP) • Mangrove plantation- 50,000ha. (8th FYP) • Enrichment planting (Mangrove)-2,700ha. Jhaw-900ha. (8th FYP) • Golpata-1400KM (8th FYP) • Conduct of one GHG Inventory (8th FYP) • Ecotourism development in Protected Area- 40 Nos. (8th FYP)	• Area under forest cover will be 20% of total land by 2041. (PP2041) • Total employment in forestry will increase by 10% every year (of which 2% increase will be for women). (CIP) • Gross value added in forestry will be 1.86% of overall GDP. (CIP) • Aquaculture plan in place by 2021 and at least 5 projects under conservation objective initiated. (CIP) • Wildlife Protection (SMART patrolling in all PA and Combat transboundary wildlife crime) (8th FYP) • Mangrove plantation- 50,000ha. (8th FYP) • Enrichment planting (Mangrove)-2,700ha. Jhaw-900ha. (8th FYP) • Golpata-1400KM (8th FYP) • Conduct of one GHG Inventory (8th FYP) • Ecotourism development in Protected Area- 40 Nos. (8th FYP)		• 15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world • 15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species. • 15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts. • 15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation • 2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment

SAP ECC Theme	SAP ECC Strategy/Programme	National Targets	SDG Goal	SDG Targets
T7: Food Security, Social Protection and Health	1. Ensure increased agricultural productivity in the face of environmental problems and climate change adversities 2. Promote research and extension of stress-tolerant varieties or species 3. Massive expansion of climate-smart agriculture practices 4. Promotion of agricultural diversification and expansion of horticultural crops 5. Crop zoning, land use planning and promotion of precision agriculture 6. Ensure food and nutrition security, social safety net and good health against the negative impact of climate change and unexpected pandemics like COVID18	• Significant growth of the agriculture, industry and service sectors. (7FYP). • Achieve self-sufficiency in food by 2012.	SDG Goal 2 AND 3	• 2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment • 2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality • 2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round • 3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases • 3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks

SAP ECC Theme	SAP ECC Strategy/Programme	National Targets	SDG Goal	SDG Targets
T8: Institutional Strengthening, Coordination and Governance	1. Enhance collaboration among public, private sectors, GO/NGO, Civil Societies and Academia 2. Ensure both vertical and horizontal coordination among ministries and agencies 3. Improvement of governance of environment and climate change through integrated and coordinated enforcement mechanism, increased transparency and accountability 4. Promote and ensure proper and effective use of enforcement tools and techniques 5. Ensure availability and accessibility of climate finance in a sustainable way to facilitate investment for climate change adaptation and mitigation 6. Promote private sector engagement in climate financing along with public sector 7. Enhance the use of ICT for knowledge, data and information sharing	• Raise BDT370 billion (US$5 billion) in climate finance for the Climate Change Adaptation Programme. (BDP 2100) • Public finance is expected to increase from its current level to 1.5% of GDP by FY2025. (BDP 2100) • By 2020, BDT270 billion (US$3 billion) in public sector funds will be available, rising to BDT450 billion (US$6 billion) in 2025. (BDP) • Scale-up of private finance to 0.5% of GDP by FY2025. (BDP) • Total annual resources available are targeted to reach BDT623 billion (US$8 billion) by FY2025, and to grow with GDP thereafter (BDP) • 99% of total expenditures on the plan will be publicly financed. (BDP) • Environmental performance Index International ranking Top 50% by 2025 (8th FYP) • Core environmental Spending 1.5% of GDP by 2025 (8th FYP) • Accelerate the accreditation of more NIEs for utilizing the Green Climate Fund (GCF) (8th FYP) • Strengthening External monitoring of BCCT (8th FYP)	SDG Goal 8, 13, 16 and 17	• 8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries. • 13.a Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly US$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible. • 13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in the least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities. • 16.3 Promote the rule of law at the national and international levels and ensure equal access to justice for all. • 16.5 Substantially reduce corruption and bribery in all their forms • 16.6 Develop effective, accountable and transparent institutions at all levels • 16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels

SAP ECC Theme	SAP ECC Strategy/Programme	National Targets	SDG Goal	SDG Targets
				• 16.a Strengthen relevant national institutions, including through international cooperation, for building capacity at all levels, in particular in developing countries, to prevent violence and combat terrorism and crime • 16.b Promote and enforce non-discriminatory laws and policies for sustainable development • 17.1 Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection • 17.2 Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of gross national income for official development assistance (ODA/GNI) to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries • 17.7 Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favorable terms, including on concessional and preferential terms, as mutually agreed

SAP ECC Theme	SAP ECC Strategy/Programme	National Targets	SDG Goal	SDG Targets
T9: Research Innovation and Capacity Development	1. Enhance institutional capacity and human skill development to mainstream climate change and environmental issues into the development planning and implementation process 2. Encourage innovative research and knowledge management to bridge the lesson learned with emerging developments 3. Enhance opportunities for collaborative research with academia	• Build the institutional capacity and research towards climate-resilient cultivators and their dissemination. (BCCSAP) • Development of climate-resilient cropping systems appropriate to different agro-climatic regions. (BCCSAP) • Develop drought management options for farmers. (BCCSAP) • Development of adaptation strategies in the fisheries sector.(BCCSAP) • Development of options for adaptation in the livestock sector. (BCCSAP) • At least 10 studies will be made on Assessments related to water accounting and identification of water productivity gaps in drought-prone areas. (CIP) -Facilitate the technology transfer on adaptation and mitigation from developed countries through Climate Technology Centre and Network (CTCN) and Joint Crediting Mechanism (JCM) (8th FYP)	SDG Goal 13	• 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

Annex 3: Investment Plan

Project Code	Thematic Areas	Project/Programme Name	Implementing Agency	Lead Ministry	Supporting Agency	Duration	Tentative Cost in Crore BDT	Private Sector Engagement Potentiality
T1.1	T1: Local Level Climate Change Adaptation and Resilient Infrastructures	Implementation of the programme of National Adaptation Plan	DoE, BWDB, LGD, MoA, MoFL, FD	MoEFCC	BCCT, ERD, DDM, CEGIS, C3ER	Long	1000	Yes
T1.2		Strengthening disaster preparedness through Climate Change Adaptation for Disaster Risk Reduction from slow and rapid onset disasters	DDM	MoDMR	BWDB, District Administration, BCCT, CEGIS	Medium	1500	Yes
T1.3		Promotion of Alternative Income Generation Activities to counter the loss of livelihoods resulting from climate change-induced impacts	BCCT	MoEFCC	BSIC, DSS, RDCD, MoWCA	Medium	300	No
T1.4		Development of market mechanism (subsidy scheme) to promote the business of climate-friendly products, such as improved cooking stoves, solar lanterns, solar water heaters, solar cookers and micro wind turbines	MoI	MoI	MoF, MoPEMR, MoC	Short	120	Yes
T1.5		Construction of Elevated Village Platforms for the Haor Areas	LGED	MoLGRDC	DBHWD, WARPO, BCCT	Medium	1500	No
T1.6		Implementation of climate change adaptation programmes in climate-vulnerable offshore small islands and riverine char lands in Bangladesh	DoE, BWDB	MoEFCC	BCCT	Short	84	No
T1.7		Study on conservation and utilization of indigenous knowledge and traditional practices' within ECC sector interventions	DoE, DAE	MoEFCC	NARS Institues, BFRI, BFRI, BLRI, CEGIS, MoWCA	Short	35	No

Project Code	Thematic Areas	Project/Programme Name	Implementing Agency	Lead Ministry	Supporting Agency	Duration	Tentative Cost in Crore BDT	Private Sector Engagement Potentiality
T1.8		Reduction of open burning of MSW by constructing new landfills sites and treatment facilities (composting, recycling, anaerobic digestion) for solid waste	LGD	MoLGRDC	City Corporation/ Municipalities	Medium	1000	Yes
T1.9		Popularization of improved kilns and replacement of traditional brick kilns with improved kilns	DoE	MoLGRDC	District Administration	Medium	600	Yes
T1.10		Popularization of improved rice parboiling units and replacement of traditional rice parboiling unit	DoE	MoEFCC	District Administration	Short	400	Yes
T1.11		New construction/Expansion of sewerage system and construction of municipal wastewater treatment plant in major urban centres	LGD	MoLGRDC	City Corporation/ Municipalities, DPHE	Medium	3000	Yes
T1.12		Climate Proofing of coastal polders by rehabilitation and adoption of DRR and CCA measures against a cyclone, storm surge and erosion	BWDB	MoWR	LGED, DDM, District Administration, BCCT	Medium	12000	No
T1.13		Development of green public transport system to reduce emissions of climate stressors (e.g. GHGs, vehicular radiation) in Cities and Towns	City Corporations, LGD	MoLGRDC	Department of Police, MoRTB	Medium	5000	Yes
T1.14		Renovation and new construction of MujibKella, crop shelters and seed godowns in haor areas	LGED, DBHWD, BWDB	MoLGRDC	DDM, BCCT	Short	1000	No
T1.15		Installation of lightning arresters and plantation of Palm tree	DDM, LGED/ REB, FD	MoDMR	DDM, District Administration, MoEFCC	Short	300	Yes
T1.16		Establishment and maintenance of multi-purpose cyclone and flood shelters considering climate change impact on disaster intensity	DDM, LGD	MoDMR	MoLGRDC, BCCT	Short	2000	No

Project Code	Thematic Areas	Project/Programme Name	Implementing Agency	Lead Ministry	Supporting Agency	Duration	Tentative Cost in Crore BDT	Private Sector Engagement Potentiality
T1.17		Implementation of adaptation programme of Mujib Climate Prosperity Plan 2030	MCPP Unit, DoE, MoA, MoFL, LGD, MoWR, FD	PMO	ERD, MoF, BCCT, CEGIS, C3ER, ICCCAD	Medium	1000	Yes
T1.18		Development of climate-resilient stormwater/urban drainage infrastructures, facilities and services of municipalities and cities	LGD	MoLGRDC	WARPO, WASAs, City Corporation/Municipalities, City Development Authorities, BCCT, CEGIS	Medium	2000	No
T2.1	T2: Green Growth and Low Carbon Development	Replacement of all traditional cookstoves by efficient cookstoves and clean fuel	SREDA	MoPEMR	IDCOL, PKSF, MoEFCC, ERD, MoWCA	Medium	500	Yes
T2.2		Improvement in energy-consuming pattern in transport sector and options for mitigation	SREDA	MoPEMR	IDCOL, PKSF, MoEFCC, ERD	Long	1500	Yes
T2.3		Development of Renewable energy (solar, wind-power park, tidal and wave energy, ocean renewable energy and biogas plants) to increase contribution into the national energy production and consumption	SREDA	MoPEMR	IDCOL, PKSF, MoEFCC, ERD	Long	6000	Yes
T2.4		Creation and maintenance of coastal greenbelt as a NbS to manage storm surge risk	FD	MoEFCC	DDM, District Administration, CEGIS	Medium	6000	No
T2.5		Development of solar home systems to rural households and solar mini-grids in growth centres that are disconnected from electricity grids	SREDA	MoPEMR	IDCOL, PKSF, MoEFCC, ERD	Medium	2000	Yes
T2.6		Implementation of renewable energy-based and mitigation programme of Mujib Climate Prosperity Plan 2030	SREDA, MoPEMR, MoEFCC, MCPP Unit	PMO	ERD, MoF	Medium	1500	Yes

Project Code	Thematic Areas	Project/Programme Name	Implementing Agency	Lead Ministry	Supporting Agency	Duration	Tentative Cost in Crore BDT	Private Sector Engagement Potentiality
T2.7		Implementation of Energy Efficiency and Conservation Plan 2030	SREDA, MoPEMR, MoEFCC	MoPEMR	DoE, IDCOL, PKSF, MoF, BB	Long	600	Yes
T2.8		Development of guidelines for carbon capture and sequestration from conventional fossil fuel burning or coal-based power plants	DoE	MoEFCC	SREDA, MoPMER, CEGIS	Short	20	No
T2.9		Development of Green Growth strategy for Bangladesh	DoE	MoEFCC	ERD, MoF, SREDA, MoPEMR, CEGIS	Short	40	No
T3.1	T3: Urban Environment Management	Development of an appropriate regulatory tool for protecting flood flow zone and low-lying wetlands in Greater Dhaka	WARPO	MoWR	BWDB, RAJUK, BCCT, CEGIS	Short	35	No
T3.2		Design and implementation of environmentally friendly and efficient sewerage, waste and wastewater collection and treatment systems	LGD	MoLGRDC	WASAs, City Corporation/ Municipalities, Industrial Police	Medium	2000	Yes
T3.3		Implementation of Pilot Projects of adopting nature-based LID measures for enhancement of stormwater drainage capacity and stormwater quality control in cities and towns	City corporations, LGD	MoLGRDC	City Development Authority, District Administration, BCCT, CEGIS, IUCN	Short	300	No
T3.4		Construction and improvement of small-scale infrastructures to ensure sanitation and hygiene of slum dwellers or marginal people	LGD	MoLGRDC	City Corporation/ Municipalities	Short	1000	Yes
T3.5		Development Urban forestry and Farming	FD, LGD	MoEFCC	City Corporation/ Municipalities, District Administration	Medium	1000	No
T3.6		Implementation of rainwater harvesting system in all government buildings, including schools, cyclone shelters, and local government institutions	LGD	MoLGRDC	City Corporation/ Municipalities, BWDB, District Administration, BMDA	Medium	1500	Yes

Project Code	Thematic Areas	Project/Programme Name	Implementing Agency	Lead Ministry	Supporting Agency	Duration	Tentative Cost in Crore BDT	Private Sector Engagement Potentiality
T3.7		Nature-based landscaping of urban cities to reduce heat island effect and enhance urban resilience	City Corporations, LGD	MoLGRDC	City Corporation/ Municipalities, District Administration, BCCT, CEGIS	Medium	6000	No
T3.8		Implementing groundwater monitoring in Divisional cities and development of regulatory tools and techniques to prevent excessive depletion	WARPO, DPHE	MoWR	DoE,BWDB, BMDA, WASAs, CEGIS, IWM	Short	800	No
T4.1		Assessment of lead and mercury pollution in the country and development of the Action Plan for mitigation	DoE,WARPO	MoEFCC	BWDB, City Corporation	Short	110	No
T4.2		Formulation of a policy regulation to define authorized zones for ship-breaking, recycling and waste management, etc. and regulatory enforcement to ensure environmental compliance	DoE	MoEFCC	MoC, MoS	Short	20	No
T4.3		Implementation of Integrated Water Quality Monitoring and Pollution Control in greater Dhaka and greater Chattogram	DoE, WARPO, DPHE	MoEFCC	BWDB, WASAs, LGD	Short	300	No
T4.4		Review and Update of the National Action Plan on Persistent Organic Pollutants (POPs) in line with capacity building for ratification of the Stockholm Convention as amended in 2009	DoE	MoEFCC	Academia	Short	35	No
T4.5		Development of air pollution controlling system especially in construction work and industrial unit	DoE	MoEFCC	Academia, City Corporation	Short	100	Yes
T4.6		Feasibility study of using alternative material for brick making in an advanced and environment-friendly brick manufacturing industry	DoE	MoEFCC	National Housing Authority (NHA), PWD	Short	50	No

Project Code	Thematic Areas	Project/Programme Name	Implementing Agency	Lead Ministry	Supporting Agency	Duration	Tentative Cost in Crore BDT	Private Sector Engagement Potentiality
T4.7		Establishment of treatment units for toxic and hazardous chemicals and sludge generated in industrial sectors through public-private partnerships	MoI	MoI	DoE, MoC, WASAs, LGD, City Corporations/ Municipalities, Industrial Police	Long	5000	Yes
T4.8		Development and Piloting of "Polluter pays" scheme or policy and assess the probable outcome of implementing it	DoE	MoEFCC	Academia, MoI	Short	200	No
T4.9		Assessment and improvement of collection systems for household solid waste (including the separation of waste at the household level)	LGD	MoLGRDC	DoE, WASAs, City Corporation/Municipalities	Medium	3000	Yes
T4.10		Design and implementation of the solid-waste management plans in accordance with the 4R policy (i.e. "reduce, reuse, recycle and recover")	DoE	MoEFCC	LGD, MoI, WASAs, City Corporation/Municipalities	Medium	2000	Yes
T4.11		Inventory preparation of illegal dumping sites in cities and measures to remove those	DoE	MoEFCC	WASAs, City Corporation/ Municipalities, RAJUK, CDA, KDA	Short	100	No
T4.12		Expansion of Matuail Sanitary Landfill Including Land Development	LGD	MoLGRDC	RAJUK, Dhaka South City Corporation	Medium	5000	Yes
T4.13		Implementation of Waste to Energy Project	SREDA, LGD	MoPEMR	MoLGRDC, MoEFCC, DoE, IDCOL, PKSF	Medium	3000	Yes
T4.14		Implementation of Programmatic CDM Using Municipal Organic Waste	LGD	MoLGRDC	City Corporation/ Municipalities, MoPEMR	Medium	1000	No
T4.15		Protection of Sundarbans from oil spill pollution as well as noise pollution	FD	MoEFCC	Coastguard, Sea Port Authorities, River Port Authorities, BIWTA, Industrial Police, Coast Guard and Bangladesh Navy	Medium	500	No
T4.16		Implementation of Surface water clean-up drive programme	WARPO	MoWR	BWDB, MoS	Medium	3000	No

Project Code	Thematic Areas	Project/Programme Name	Implementing Agency	Lead Ministry	Supporting Agency	Duration	Tentative Cost in Crore BDT	Private Sector Engagement Potentiality
T4.17		Development and implementation of Payment for Ecosystem Services (PES) scheme to promote conservation of forests from encroachments	FD, DoE	MoEFCC	DAE, LGED	Short	500	No
T5.1	T5: Blue Economy	Strengthening infrastructures to monitor sea level along the coast of the Bay of Bengal	BWDB	MoWR	IWM, BIWTA, BCCT, CEGIS	Short	300	No
T5.2		Assessment of Coastal and Marine Biodiversity Resources and Ecosystems to Implement the Blue Economy Action Plan	DoF, DoE	MoFL	BARC,DBHWD, Deoartment of Forest, Academia, CEGIS	Short	300	No
T5.3		River dredging and revetment work in Major Rivers for conserving water and protection of land from erosion	BWDB	MoWR	BIWTA, MoS, LGIs, BCCT, CEGIS	Medium	20000	No
T5.4		Assessment of environmental flow requirement for 54 Transboundary rivers	WARPO	MoWR	BWDB, CEGIS	Short	70	No
T5.5		Development of a sound policy framework for harnessing the potential of the blue economy	WARPO	MoWR	Academia, CEGIS, EMRD, MoS, MoFL	Short	80	No
T5.6		Research on Seaweed culture for nutrition and multipurpose uses and cage fish culture	BFRI	MoFL	BSMRMU, Academia, EMRD	Medium	200	No
T5.7		Optimization of Surface and Ground Water Resources in North-West Region of Bangladesh by Integrated Land Environment and Water Resources Management	WARPO	MoWR	Barind Multipurpose Development Authority, BWDB, BCCT, CEGIS	Short	80	No
T6.1	T6: Forest, Ecosystem and Biodiversity	Feasibility study of the restoration of 20 thousand acres of the denuded Chokoria-Sundarbans Reserve Forest with time-bound action and monitoring plan	FD	MoEFCC	LGIs, CEGIS	Short	45	No

Project Code	Thematic Areas	Project/Programme Name	Implementing Agency	Lead Ministry	Supporting Agency	Duration	Tentative Cost in Crore BDT	Private Sector Engagement Potentiality
T6.2		Implementation of Ecosystem-based Management in Haor and other ecologically critical wetlands	FD	MoEFCC	DBHWD, BCCT, CEGIS	Medium	1000	Yes
T6.3		Hill forest Restoration programme (ANR with Enrichment Plantation, Stand Improvementwith Indigenous Spp. Enrichment Plantation, Mixed Plantation with Fast Growing Species, Mixed Plantation with Slow Growing Species, Teak Coppice Management with Compost Fertilization)	FD	MoEFCC	CHTDB, LGIs, CEGIS	Medium	2000	No
T6.4		Tree plantation (including medicinal plant, rare and endangered Spp., seed orchard and arboretum) project in Bangladesh	FD	MoEFCC	LGD, LGIs	Medium	1000	Yes
T6.5		Identification and Demarcation of Wildlife corridor and plantation	FD	MoEFCC	LGD, LGIs	Short	600	No
T6.6		Wildlife conservation project	FD	MoEFCC	LGD, LGIs, Coast Guard, Forest Police	Medium	500	No
T6.7		Survey on Hotspot identification for wildlife crime control and routine patrol through SMART patrolling	FD	MoEFCC	LGD, LGIs, Coast Guard, Forest Police	Short	100	No
T6.8		Study to scale-up alternative income-generating activity for forest-dependent communities	FD	MoEFCC	LGD, LGIs, BCCT	Short	60	Yes
T6.9		Nursery raising (10 acres per year) and social forestry programme	BFIDC	MoEFCC	LGD, LGIs	Medium	1000	No
T6.10		Taxonomic Studies & Publication	BNH	MoEFCC	FD, LGD, LGIs	Short	100	No
T6.11		Re-plantation of rubber and rubber garden area increasing project	BNH	MoEFCC	FD, LGD, LGIs	Medium	1000	Yes
T6.12		Increase Cotton Production & Poverty Alleviation project of Farmers of Chattogram Hill Tracts	BFIDC	MoEFCC	FD, LGD, LGIs	Medium	1200	Yes

Project Code	Thematic Areas	Project/Programme Name	Implementing Agency	Lead Ministry	Supporting Agency	Duration	Tentative Cost in Crore BDT	Private Sector Engagement Potentiality
T6.13		Rehabilitation & Restoration of Beels	DBHWD	MoWR	LGD, LGIs, BCCT	Medium	2000	No
T6.14		Development and Establishment Project of Fish Sanctuaries	DoF	MoFL	DoE, LGD, BCCT, CEGIS	Short	1000	No
T6.15		Expansion of Ecotourism Project	FD, DoE	MoEFCC	Parjatan Corporation, LGD, BCCT, CEGIS	Medium	1000	Yes
T7.1	T7: Food Security, Social Protection and Health	Sustainable Irrigation Scheme in the face of climate change for the North-west region of Bangladesh	BWDB	MoWR	BMDA, MoEFCC, BCCT	Medium	2000	No
T7.2		Enhancement of Climate Change Resilience of agriculture sector by introducing climate-resilient crop varieties and alternative farming practices	DAE, NARS Institutes	MoA	DoE, MoEFCC, BWDB, WARPO, BCCT	Medium	2000	No
T7.3		Development of stress tolerant vegetables, fruits, pulses, oilseed and tuber crops with nutrient enriched varieties.	NARS Institutes	MoA	DoE, MoEFCC, BWDB, WARPO, BCCT	Medium	1500	No
T7.4		Improvement of Farmer's Livelihood through Cropping Systems Research and Development in the Central and Southern Region of Bangladesh	NARS Institutes	MoA	DoE, MoEFCC, BWDB, WARPO, BCCT	Short	175	No
T7.5		Selection and extension of salt tolerant mangrove species for coastal and saline prone areas of Bangladesh in relation to climate change issues.	FD, BFRI	MoEFCC	DoE, MoEFCC, BWDB, WARPO, BCCT	Short	150	No
T7.6		Expansion and Diversification of Floating Agriculture in Haor Areas	DAE	MoA	DoE, MoEFCC, BWDB, WARPO, BCCT	Medium	500	Yes
T7.7		Development and Management Project for the natural breeding ground of fisheries in Halda river	DoF, BFRI	MoFL	DoE, MoEFCC, BWDB, WARPO, BCCT, CEGIS	Short	800	No
T7.8		Study on health due to heat stress or heat waves during excessive summer temperature and its adaptation measures for urban areas of Bangladesh	DoE	MoEFCC	DGHS, DoE, MoEFCC, BWDB, WARPO, BCCT, CEGIS	Short	30	No

Project Code	Thematic Areas	Project/Programme Name	Implementing Agency	Lead Ministry	Supporting Agency	Duration	Tentative Cost in Crore BDT	Private Sector Engagement Potentiality
T8.1	T8: Institutional Strengthening, Coordination and Governance	Improvement of coordination mechanism of all sectoral ministries, agencies and enhanced engagement of civil society and NGOs for environmental management and climate change issues	DoE	MoEFCC	MoWR, MoPEMR, MoLGRDC, MoS, MoI, MoFL, MoA, MoC, MoWCA, MoCHT, MoPA, MoF, GED, MoP, PMO, Private Sectors	Short	70	Yes
T8.2		Establishment of Coordination Cell to facilitate Private Sector Engagement in implementation and financing of ECC initiatives	DoE	MoEFCC	MoWR, MoPEMR, MoLGRDC, MoS, MoI, MoFL, MoA, MoC, MoWCA, MoCHT, MoPA, MoF, GED, MoP, PMO, Private Sectors	Short	75	Yes
T8.3		Adoption of internationally verified forest certification schemes for increasing access of Bangladesh forest products to international markets	BFIDC	MoEFCC	FD,MoI, MoC	Medium	80	Yes
T8.4		Design and Implementation of instruments that can provide economic incentives for better environmental management and the provision of ecosystem services	DoE	MoEFCC	ERD, MoF, MoC, GED, IDCOL, PKSF, IUCN, MoA, MoFL	Short	500	Yes
T8.5		Review and enhancement of the performance of the environmental court concerning arbitration among the users of ecosystem services	DoE	MoEFCC	FD, MoWR, MoI, MoC, MoS, LGD	Short	50	No
T8.6		Promotion of ISO 14000 environmental management standard by piloting the project in selected industrial companies	DoE	MoEFCC	MoI,MoC, LGD, LGIs, Industrial Police	Short	50	Yes
T8.7		Strict enforcement of a ban on polythene and promotion of the use of cotton and jute bags	DoE	MoEFCC	BFIDC, MoC	Short	250	Yes
T8.8		Strengthening of MoEFCC Climate Change Trust Fund	BCCT	MoEFCC	ERD, MoF, GED, IDCOL, PKSF, PMO	Medium	50	Yes

Project Code	Thematic Areas	Project/Programme Name	Implementing Agency	Lead Ministry	Supporting Agency	Duration	Tentative Cost in Crore BDT	Private Sector Engagement Potentiality
T8.9		Update of Bangladesh Climate Change Gender Action Plan	DoE	MoEFCC	MoWCA, CHTDB, LGD, CEGIS, C3ER	Short	25	No
T9.1	T9: Research, Innovation and Capacity Development	Integrated REDD+ sub-national implementation plan for the Hill Region	BNH	MoEFCC	FD, LGD, CHTDB	Short	25	No
T9.2		Development and Popularization of Quality Seed Source	BNH	MoEFCC	FD, LGD, BFRI	Short	20	Yes
T9.3		Developing Bangladesh National Red List of Plants and Developing Invasive Alien Plant Species (IAPs) Management Strategy for selected protected areas	BNH	MoEFCC	FD, DBHWD	Short	30	No
T9.4		Digitization of herbarium specimens project	BNH	MoEFCC	FD, BFRI	Short	150	No
T9.5		Technical assistance for saline water purification technology at household level and low-cost, durable housing technology for coastal areas of Bangladesh	BCCT	MoEFCC	CEGIS, DPHE, WASA, MoWCA	Medium	2500	Yes
T9.6		Development of a national drought monitoring system	BCCT	MoEFCC	CEGIS, DPHE, WASA	Short	100	No
T9.7		Capacity building training project on "Mainstreaming Environment, Climate Change and Disaster Risk Management into Development Planning" at the local and central level	BCCT	MoEFCC	GED, PC, CEGIS, C3ER	Short	100	No
T9.8		Capacity development of government officials for integrating Payment for Ecosystem Services (PES) into development planning	DoE	MoEFCC	FD, LGD, LGIs, CEGIS	Short	25	No
T9.9		Enhancement of the enforcement, monitoring and surveillance capacity of the Forest Department and the Department of Environment	DoE, FD	MoEFCC	Industrial Police, LGD, LGIs	Short	100	No

Project Code	Thematic Areas	Project/Programme Name	Implementing Agency	Lead Ministry	Supporting Agency	Duration	Tentative Cost in Crore BDT	Private Sector Engagement Potentiality
T9.10		Inclusion of Disaster Impact Assessment in Environmental Impact Assessment and Development of Sectoral Guideline for Carrying out Environmental Impact Assessment	DoE	MoEFCC	PD, GED, PC, DDM, CEGIS	Short	50	No
T9.11		Human Resources and Skill Development of of MoEFCC and its agencies	MoEFCC	MoEFCC	MoPA, BPATC, CEGIS, C3ER, NILG	Short	500	No
T9.12		Implementation of projects under Bangladesh Environmental Statistics Framework for Environment, Climate Change and Disaster-Related Statistics Generation and Update	BBS	MoP	DoE, MoEFCC, DDM, MoDMR	Medium	500	No

Annex 4: Result Based Monitoring Framework

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
Local Level Climate Change Adaptation and Resilient Infrastructures	Promote initiatives to enhance climate resilience of communities among cross-cutting sectors and different levels	Loss and damages due to climate change-induced disasters will be reduced	Reduce the number of deaths, missing persons and directly affected persons attributed to disasters to 1500 per 100,000 population (SDG Indicator 13.1.1, NPI 32)	Number	2014	3500	DDM, MoDMR, BDRHS, BBS, SID	2000	1500	1000
		Ecosystem-based adaptation at the local level will be promoted	EbA & CbA approaches embedded in key planning and policy documents	Number of Projects per FYP			PC, DoE, IMED	20	40	50
		A climate-resilient market system will be developed	The proportion of small-scale industries with a loan or line of credit (SDG Indicator 9.3.2)	%			SMI, BBS, SID	30	50	70
		Alternative income-generating activities will be increased, leading to enhance resilience against tackling disasters	Reduce the ratio of income of top 10% population and bottom 10% population to 20	Ratio	2016	37.8	BBS, SID	30	20	15
	Integrating climate change adaptation into local level development planning	Climate-resilient social services facilities will be ensured	The proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management(SDG Indicator 6.b.1)	%			DPHE, LGD	30	60	80
		Private sector investment will be increased for local-level adaptation	The proportion of small-scale industries with a loan or line of credit (SDG Indicator9.3.2)	%			SMI, BBS, SID	30	50	70

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
	Ensure participation of women, marginalized groups in climate-resilient development and decision-making process	Gender-sensitive planning and programmes will be introduced	Adopt and strengthen sound policies and enforceable legislation to promote gender equality and the empowerment of all women and girls at all levels (SDG indicator 5c.)	Number			FD, MoWCA			
			Increase the female labour force participation rate to 50% (NPI16)	%	2015	35.6	BBS, SID	40	50	60
		The leadership of women and marginalized groups in ECC development planning will be visible	The proportion of women in managerial positions (SDG Indicator 5.5.2)	%	2015-2016	11.4	QLFS, BBS, SID	23	35	50
		The social disparity will be reduced	The proportion of countries with systems to track and make public allocations for gender equality and women's empowerment(SDG Indicator 5.c.1)	Qualitative			FD, MoWCA			
			Increase the female labour force participation rate to 50% (NPI 16)	%	2015	35.6	BBS, SID	40	50	60
	Integration of community and their local knowledge for sustainable climate-resilient environment management	Participatory and community-based management of the ECC sector will be ensured	Number of rural communities with disaster-resilient habitats and communities' assets	Number/ year	2018-2019	250	DDM, BWDB, BBS, SID	500	1000	1500
		Integration of indigenous knowledge into development planning will be ensured	Formation of water management group	Number	2018-19	330	BWDB	500	700	1000

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
		Social conflicts will be reduced	Complaints settled within the stipulated time	%			DOE, WARPO	60	80	100
	Integrating climate change in the design and development of infrastructures Development of climate-resilient infrastructures and cities									
		Waterlogging and drainage congestion will be reduced	Small river, canal and water storage excavation	Sum	2015	900	BWDB	1200	1500	2000
			Waterlogging free area	%	2016	97	BDP2100, BWDB, BBS	100	100	100
			Waterlogging free people	Number in Millions	2016	0.9	BWDB, BBS, CEGIS, IWM, BDP2100	0.5	0.2	0.1
			Repair/ increase of height of coastal embankment	km	2019-2020	200	BWDB	400	1000	1500
		Loss and damages due to climate change-induced disasters will be reduced	Catastrophic flood affected area	% of Bangladesh	2016	60	BWDB, BBS, CEGIS, IWM, BDP2100	58	55	50
			Storm surge affected area	% of Coastal Zone	2016	29	BWDB, BBS, CEGIS, IWM, BDP2100	20	10	5
			Dry season salinity intrusion free area	% of Coastal Zone	2016	47	BWDB, BBS, CEGIS, IWM, BDP2100	48	50	55
			Flood vulnerable people	Number in Millions	2016	88	BWDB, BBS, CEGIS, IWM, BDP2101, DDM	60	40	30
			Cyclone vulnerable people	Number in Millions	2016	8	BWDB, BBS, CEGIS, IWM, BDP2102, DDM	7	6	5
			Erosion vulnerable people	Number in Millions	2016	1	BWDB, BBS, CEGIS, IWM, BDP2103, DDM	0.7	0.5	0.2

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
			Reduce the number of deaths, missing persons and directly affected persons attributed to disasters to 1500 per 100,000 population (SDG Indicator 13.1.1, NPI 32)	Number	2018-2019		DDM, MoDMR, BDRHS, BBS, SID	2000	1500	1000
		Reduction of carbon emission will be ensured as committed by NDC	Converting Conventional Brick kiln to advanced technology	%	2018-2019	71.82	DOE. BFD, MoEFCC, MoPMER, MoI, MoC	75	80	85
			Campaign /Mobile court against contaminating Brick kiln	Number	2018-2019	797	DOE	420	430	450
			Reduce black carbon emission	%			DOE, SLCP Plan	30	40	50
			Reduction of emission replacing conventional brick kilns with a modern one	%			DOE, SLCP Plan, BFD, MoEFCC, MoPMER	50	70	80
			Reduction of emission replacing rice parboiling units with an improved one	%			DOE, SLCP Plan	40	45	53
			Less usage of Ozon depleting substances	Ton	2018-2019	48.2	DOE	45	40	35

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
	Promote Adaptive and flexible structural interventions to tackle deep uncertainties of climate change integrating nature-based elements	Optimum capital investment will be ensured	Funding in projects according to BCCSAP/SDG/other planning	%	2018-2019	100	BCCT	100	100	100
		Recurrent costs for periodic maintenance will be reduced, and savings can be reutilized in other required investment	Monitoring in existing projects with funding from CCTF	Number	2018-2019	48	BCCT	65	70	80
			Evaluation of finished projects by CCT	%	2018-2020	6	BCCT	15	25	50
		Climate-resilient economic growth will be ensured	The total amount of funding for developing countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies (SDG Indicator17.7.1)				ERD			
	Mainstream and scaling up of Nature-based Solutions for Climate Change Adaptation	Green growth development will be introduced and enhanced	Tree Plantation in coastal areas	Sum	2015	50	BWDB, BFD	108	120	150
		Carbon emission will be reduced	Less usage of Ozon depleting substances	Ton	2018-2019	48.2	DOE	45	40	35
Green Growth and Climate Change Mitigation	Introduce and promotion of low carbon development and green infrastructures	Promotion of nature-based solutions or hybrid structures (mixed of green and grey structure)	Installed renewable energy-generating capacity in developing countries (in watts per capita) (SDG Indicator 7.b.1)	watts per capita			SREDA, PD			
		Increased use of renewable energy day to day activities will be achieved	Renewable energy share in the total final energy consumption (SDG Indicator 7.2.1)	%	2015	2.79	SREDA, PD	5	10	15
		Increased revenue from the tourism sector	Number of Tourist	Lakh (Number)	2018-2019	49	FD	55	60	80

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
	Promotion of investment for Nature-based-Solutions (NbS) to accelerate green growth	Green growth development will be introduced and enhanced	Tree Plantation in coastal areas	Sum	2015	50	BWDB, BFD	108	120	150
		Carbon emission will be reduced	Less usage of Ozon depleting substances	Ton	2018-2019	48.2	DOE	45	40	35
	Reducing carbon emission through introducing innovative low carbon technologies, pro-forestation, afforestation and increased use of renewable energy	Reduction of carbon emission as per NDC commitment and carbon sequestration	CO2 emissions reduction	%	2012	0.98	NPI. DoE, BFD, MoEFCC, MoPMER, MoRTB, MoI, MoC, LGD	3	5	10
			Reforested area	Ha	2018-2019	1300	FD, MoEFCC, DoE, MoI, MoC, LGD, MoPMER, MoRTB, MoJT	1400	1450	1600
			Afforested area	Ha	2018-2019	3650	FD, MoEFCC, DoE, MoI, MoC, LGD, MoPMER, MoRTB, MoJT	12000	13000	15000
Urban Environment Management	Ensure sustainable management of urban environment considering climate change and other environmental degradation	Protection and conservation of urban wetlands and ecosystems will be ensured	Industrial liquid waste discharge plan approval	Number	2018-2019	75	DOE	80	90	100
			Percentage of wetland and natural sanctuaries maintained	%	2015	12	NPI	12	20	25

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
		Water supply, sanitation and hygiene services will be ensured in a sustainable manner	The proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water (SDG Indicator6.2.1)	%	2019	74.8	MICS, BBS, SID, PHC, BBS, SID, SVRS, BBS, SID	85	100	100
			Ensure 100% population using safely managed drinking water services (SDG Indicator 6.1.1, NPI 17)	%	2019	44.7	MICS, BBS, SID	100	100	100
		Citizen awareness will be build-up for waste management	Campaign against polluters	Number	2018-2019	690	DOE	360	380	450
		Introduction of 4R strategy or IT-based monitoring of waste as well as environment management	Effluent Treatment Plant (ETP) Coverage to control industrial pollution	%	2018-2019	77.95	DOE	82	85	90
	Integrate Low Impact Development (LID) Best Management Practices (BMP) for urban environment development and management	Nature-based solutions will be promoted	The total area under wetlands restoration projects (completed)				FD, DBHWD, DoE			

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
		Carbon emission will be reduced	Converting Orthodox Brick kiln to advanced technology	%	2018-2019	71.82	DOE	75	80	85
			CO2 emissions reduction	%	2012	0.98	NPI. DoE, BFD, MoEFCC, MoPMER, MoRTB, MoI, MoC, LGD	3	5	10
			less usage of Ozon depleting substances	Ton	2018-2019	48.2	DOE	45	40	35
		Stormwater drainage and quality control will be ensured	Quality of groundwater and Surface water monitored at specific locations	Number	2018-2019	1934	DOE, BWDB	2500	3000	3200
			Zero liquid discharge plan approval	Number	2018-2019	0	DOE	80	200	500
	Integrate green areas and biodiversity in urban areas	Green area will be increased, and air pollution will be decreased, carbon emission and heat island effect will be reduced	Green Area Density	Sqm/ millions of people	2018-2019	0.05	DoE, City Corporations	4	7	15
			CO2 emissions reduction	%	2012	0.98	NPI. DoE, BFD, MoEFCC, MoPMER, MoRTB, MoI, MoC, LGD	3	5	10
			Monitoring of Air Quality Index (AQI)	%day	2018-2019	75.87	DOE	67	50	30

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
	Ensure Conservation and protection of Urban Wetlands and Ecosystem	Urban water quality will be improved, and biodiversity will be reach	Urban waterbodies compliance with water quality standards	%	2018	0	DoE, City Corporations, WASAs, City Development Authority	50	80	100
			Measurement of bird species	Number			FD, BFRI			
Pollution Control	Improvement of Pollution Control Mechanism in Bangladesh	Environmental quality (Environmental Quality Index, EQI) of the country will be improved	Monitoring of Air Quality Index (AQI)	%day	2018-2019	75.87	DOE	67	50	30
			Industrial liquid waste discharge plan approval	Number	2018-2019	0	DOE	80	200	500
			Less usage of Ozon depleting substances	Ton	2018-2029	48.2	DOE	45	40	35
		The Life of River will be saved	Industrial liquid waste discharge plan approval	Number	2017-18	70	DOE	80	85	90
			Surface water polluted by industrial waste	% of the total river area	2016	11	BWDB, DOE, MoI	10	9	7
			Effluent Treatment Plant (ETP) Coverage to control industrial pollution.	Sum	2018-19	77.95	DOE	82	85	90
		Citizen and corporate awareness will be built up for pollution control	Trained family	Number/ Year	2018-2019	165	DOE	260	280	350
			Publication of research / guidelines / reports on climate change	Number	2015-16	1	DOE	5	10	15
	Ensure Beneficiary Pay Principle and strict enforcement of 'Polluter Pay' principle	Application of polluter pay principles	% of cases	%	2018-19	0	DoE, GED, PP2041	40	60	80

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
		Private entities will reduce environmental pollution measures	Campaign against polluters	Number	2018-19	690	DOE	360	380	450
	Introduce and encourage 4R and bio-initiatives for waste management to turn 'waste' into 'energy.'	Bio-safety will be ensured	plant species assessed for identification of endangered plant species	Number	2017-2018	100	BNH	100	110	120
			New plant discovered/Record	Number	2017-2018	100	BNH	100	110	120
		Introduction of 4R strategy or IT-based monitoring of waste as well as environment management	Effluent Treatment Plant (ETP) Coverage to control industrial pollution	%	2018-19	77.95	DOE	82	85	90
	Development of improved waste (solid, liquid, e-waste, medical, chemical/ hazardous etc.) management system	Improved waste management system	Urban centres with wastewater treatment facilities	%	2018	0	DoE, City Coporations, WASAs, MoI	50	80	100
Blue Economy	Sustainable and Integrated Water Resources Management aligned with BDP2100 and SDGs considering adversities of climate change	Ensure water security and governance considering uncertainties of climate change	Ensure 100% population using safely managed drinking water services (SDG Indicator 6.1.1, NPI 17)	%	2019	44.7	MICS, BBS, SID	100	100	100
		Resources optimization will be ensured through integrated land and water management	Coordination meeting between ministry and project director in a year organized by CCT	Number	2017-18	3	BCCT	5	8	10
		Wise use and management of water resources for livelihood generation will be possible	Preparation of site-specific Plan (SSP)	Number	2015	1000	FD	1200	1400	1500

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
	Turn 'Blue' into 'Resources', and it's wise Harness	Blue economy activity will be accelerated	Water quality monitoring of Bay of Bengal	Number	2018-2019	36	DOE, MoS, MoEFCC, Coast Guard, Concerned District Administration, Bangladesh Navy	40	50	100
			Hatchery of tortoises established in saint martin's island	Number	2018-2019	1936	DOE	2000	2200	2500
		Conservation of the marine ecosystem and biodiversity resources will be ensured	Afforested coastal areas	ha	2018-2019	5000	FD	5500	6000	7000
			The amount of Boro kaytta fish hatched	Number	2015-2016		DoF	60	65	70
			Area of marine habitat	ha	2016	32300	DBHWD, IUCN, BWBD,DoF	36000	40000	42000
		The contribution of GDP from Blue Economy will be increased	Country's Gross value addition from Blue Economy	%	2014-15	3.3	PC,BWDB, MoS, IMED	4	5	10
	Establish a policy framework for unlocking the potentials of the blue economy	Blue economy activity will be accelerated	Water quality monitoring of Bay of Bengal	Number	2018-2019	36	DOE, MoS, MoEFCC, Coast Guard, Concerned District Administration, Bangladesh Navy	40	50	100
			Hatchery of tortoises established in saint martin's island	Number	2018-2019	1936	DOE	2000	2200	2500
	Ensure conservation and sustainable use of the coast and marine resources	The contribution of GDP from Blue Economy will be increased	Country's Gross value addition from Blue Economy	%	2014-15	3.3	PC,BWDB, MoS, IMED	4	5	10

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
Forests, Ecosystem and Biodiversity	Ensure Conservation and Sustainable Management of Forests, Ecosystem and Biodiversity	Protection and conservation of forests, ecosystems and biodiversity will be ensured	Conservation of extinct trees	Number	2018-2019	8	BFRI	10	15	20
			Amount of forest management	ha	2018-2019	15	BFRI	45	50	80
			Garden creation and Management	ha	2018-2019	40	BFRI	45	50	80
		Conservation of the Sundarban ecosystem will be ensured	Establishment of PSP for observing vegetation and regeneration in Sundarbans	Number	2018-2019	33	BFRI	40	40	50
			Management of mangrove arboretum established in Sundarbans	Ha	2018-2019	60	BFRI	70	72	75
			Minor mangrove forests production in Keora Forest in coastal region	Ha	2018-2019	4	BFRI	5	7	10
			Minor mangrove plants production in Keora Forest in the coastal region	Number	2018-2019	1700	BFRI	1800	2000	2500
		Forest dependent alternative income generation activities will be increased, and livelihood will be improved	Number of consumers	Number	2017-2018	100	BNH	100	150	200
			Pulp production from Jigni/ Nalita	Number	2017-18	6000	BFRI	6500	7000	7500
		Wildlife crime will be reduced	Forest Animal Species	Number			BFRI, FD			
			Measurement of bird species	Number			FD, BFRI			
			Amount of smart patrolling	Km	2015-16	40000	FD	50000	40000	35000
			Number of successful wildlife rescue operations	Number			FD	55	60	70

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
	Encourage wise use of wetlands and introduce and integrate 'Payment for Ecosystem Services' in development planning	Ensure wise use of wetlands as per Ramsar guidelines	Investigation Carried out based on the allegations received	%	2018-2019	57	DOE	75	75	85
			Small river, canal and water storage excavation	Sum	2018-2019	900	BWDB	1200	1500	2000
		Promotion of PES schemes into development planning	Implementation of the project as per the inspection recommendations	Number	2018-19	25	DOE	30	40	50
			Establishment of PSP for observing vegetation and regeneration in Sundarbans	Number	2018-19	33	BFRI	40	45	50
	Ensure wildlife conservation and its habitat	Wildlife will be increased, and crime will be reduced	Amount of smart patrolling	Km	2015-16	40000	FD	50000	40000	35000
			Number of successful wildlife rescue operations	Number			FD	55	60	70
	Promote pro-forestation along with afforestation for conservation of forest, ecosystem and biodiversity	Forest coverage will be increased, and carbon sequestration	CO2 emissions reduction	%	2012	0.98	NPI. DoE, BFD, MoEFCC, MoPMER, MoRTB, MoI, MoC, LGD	3	5	10
			Amount of forest management	Ha	2018-2019	15	BFRI	45	50	80

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
Food Security, Social Protection and Health	Ensure increased agricultural productivity, agricultural diversification in the face of environmental problems and climate change adversities Promotion of agricultural diversification and expansion of horticultural crops Promote research and extension of stress-tolerant varieties or species The massive expansion of climate-smart agriculture practice Crop zoning, land use planning and promotion of precision agriculture	Climate-smart agro-technologies and practices will be enhanced	The proportion of agricultural area under productive and sustainable agriculture (SDG Indicator 2.4.1)				ASC, BBS, SID, Agriculture Production Survey, BBS, SID			
			Number of upgradations	Number	2017-2018	12	BNH	15	20	30
			New plant discovered/Record		2018-2019	1	BNH	1	1	2
		Promotion of urban agriculture to tackle the immediate crisis and enhance DRR response	Garden creation and Management	Ha	2015-2016	40	BFRI	45	50	60

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
	Ensure food security, social safety net and good health against the negative impact of climate change and unexpected pandemics like COVID19 through expansion of climate-smart agriculture	Social safety and protection will be ensured	Disaster readiness	%	2018-19		DDM, BBS, GED	40	60	80
			Reduce under-5 mortality rate to 25 per 1,000 live births (SDG Indicator 3.2.1, NPI 6)	Per 1000	2015	36	SVRS, BBS, SID, PHC, BBS, SID	27	25	20
			Reduce the maternal mortality ratio to 70 per 100,000 live births (SDG Indicator 3.1.1, NPI 7)	Per 100,000	2015	181	SVRS, BBS, SID,) PHC, BBS, SID	100	70	50
		Immunity will be strengthened, and mortality will be reduced	Number of new HIV infections per 1,000 uninfected population, by sex, age and key people (SDG indicator 3.3.1)				NASP, DGHS, HSD, UNAIDS			
			Tuberculosis incidence per 100,000 population (SDG Indicator 3.3.2)				HMSS, BBS, SID, NTP, DGHS, HSD, WHO			
			Reduce the prevalence of stunting among children under 5 years of age to 12% (SDG Indicator 2.2.1, NPI 3)		2012-2013	42	MICS, BBS, SID	20	12	10
			Number of people requiring interventions against neglected tropical diseases (SDG Indicator 3.3.5)				CDC Unit, DGHS, HSD, WHO			
Institutional Strengthening, Coordination and Governance	Enhance collaboration among public, private sectors, GO/NGO, Civil Societies and Academia	Collaboration among public and private sectors/NGO/CS/ Academia will be increased	Coordination meeting between ministry and project director in a year organized by CCT	Number	2017-18	3	BCCT	5	10	15

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
			Monitoring in existing projects by CCT	Number	2018-19	48	BCCT	70	100	100
		Knowledge and information generated from private sectors will be integrated into development planning and disseminated among private sectors	Organizing workshops on setting up high technology Brickfields at the division level for entrepreneurs	Number of entrepreneurs	2015-2016	400	DOE	450	450	600
		Enabling environment for private sector engagement in ECC investment will be ensured	The person/ Organization/ entrepreneurs receiving the services	Number	2018-19	4634	DOE	5200	5400	5500
	Ensure both vertical and horizontal coordination among ministries and agencies.	Multi-stakeholder participation will be ensured in holistic and integrated project planning, design, implementation and M&E process	Coordination meeting between ministry and project director in a year organized by CCT	Number	2017-18	3	BCCT	5	10	15
		The gap in aligned sectors and overlapping issues in cross-cutting sectors will be reduced	Monthly coordination meeting organized by CCT	Number	2018-19	12	BCCT	12	12	12
		Challenges due to overlapping jurisdiction will be addressed	Monthly coordination meeting organized by CCT	Number	2018-19	12	BCCT	12	12	12

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
	Improvement of governance of environment and climate change through integrated and coordinated enforcement mechanism increased transparency and accountability	Transparency and accountability in the ECC sector will be ensured	Service delivery commitment update	%			DOE	50	80	100
		Increased efficiency in investment utilization	Implementation of project as per the inspection recommendations	Number	2018-19	4634	DOE	5200	5400	5500
			Service delivery commitment update	%			DOE	50	80	100
		Public Service quality will be improved and ensured	Introduction feedback monitoring system for service recipients				DOE			
		Introduction of innovative techniques and technologies for the governance of ECC	Use of e-file in every division	%	2018-19	70	DOE	80	100	100
			Launch a new digital service at a minimum	Number			DOE	3	5	10
		Grievance and dispute mechanisms will be improved	Complaints settled within the stipulated time	%			DOE	50	80	100
	Promote and ensure proper and effective use of enforcement tools and techniques	Citizen behaviour will be changed, and awareness will be raised to prevent pollution	Number of conscious beneficiaries	Number	2018-2019	500	FD	600	700	1000
		Ethical behaviour will be promoted	Introduction feedback monitoring system for service recipients	Date			DOE			
			Implementation of National Integrity Action Plan	%			DOE	50	80	100

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
		Protection and conservation of Ecologically critical or fragile areas will be ensured	Conservation activities adopted in Environmentally critical area	Number	2018-19	5	DOE	5	5	5
	Ensure availability and accessibility of climate finance in a sustainable way to facilitate investment for climate change adaptation and mitigation	A sustainable climate financing mechanism will be established	Government allowance for project funding in each year	%	2017-18	66	BCCT	66	70	100
		Ease inaccessibility of funds will be ensured	Funding in projects according to BCCSAP/SDG/other planning	%	2018-19	100	BCCT, ERD as NDA, MoEFCC	100	100	100
		Knowledge and capacity regarding fund availability and accessibility will be increased, respectively	Savings from government allowance each year	%	2017-18	34	BCCT	40	50	65
	Promote private sector engagement in climate financing along with public sector	The deficit of public funds for ECC investments will be reduced	The total annual value of climate finance received from the Private sector	%				25	40	50
		Achievement of GDP as per BDP2100 will be facilitated	Increase annual growth rate of GDP to 10% (SDG Indicator 8.1.1, NPI 21)	%	2015-16	5.2	NAW, BBS, SID	9	10	12
			Increase total government revenue as a proportion of GDP to 20% (SDG Indicator 17.1.1, NPI 38)	%	2015-16	9.6	NBR, IRD, FD	17	20	25
	Enhance the use of ICT for knowledge, data and information sharing	Knowledge management and access gets easier	Knowledge hub available to people	%			ICT, DoE, PC	30	50	70

Theme	Strategy/Programme	Impact/Outcome	Proposed Indicator	Unit	Base		Responsible Agencies/ Source	Target		
					Year	Status		2025	2030	2035
Research Innovation and capacity development	Enhance institutional capacity and human skill development to mainstream climate change and environmental issues into the development planning and implementation process	Institutional capacity will be enhanced to plan, design, implement, O&M and M&E of ECC projections	Publication of research / guidelines / reports on climate change	Number	2018-2019	1	DOE	5	10	15
			Assist in the transfer of energy-efficient technologies to combat climate change	Number			BCCT	5	10	15
		The skill of human resources will be developed	Number of officers sent for training to increase the human resources capacity	Number	2017-2018	35	DOE, BCCT	40	50	60
			Per capita training hour	Hour	2018-2019		BCCT	60	60	70
		Leadership among young officials and professionals will be developed	Number of officers sent for training to increase the human resources capacity of the DOE	Number	2018-2019	30	DOE	40	50	60
	Encourage innovative research and knowledge management to bridge the lesson learned with emerging developments	The gap in knowledge generation in academia or action research and implementation or project planning and development will be reduced	Floristic Publication	Number	2018-2019	3	BNH	3	4	6
			Published Flora of Bangladesh series.	Number	2017-2018	3	BNH	3	4	6
		Knowledge and information generated from research and field level activities will be stored and managed properly	Publication of research/ guidelines/reports on climate change	Number	2018-19	1	DOE	5	10	15
		Field-based real-life problem solving or action research will be increased and encouraged	Research on Increase of strength of reusable papers	Number	2018-2019	5	BFRI	5	10	15
			Research on the increasing life cycle of wood and bamboo variety	Number			BFRI	2	5	10
	Enhance opportunities for collaborative research with academia	Quality research will be increased	Publication of research / guidelines / reports on climate change	Number	2018-2019	1	DOE	5	10	15

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