Climate Investment Funds

FIP/SC.19/7
November 17, 2017

Meeting of the FIP Sub-Committee
Washington D.C.
Wednesday, December 13 – Thursday, December 14, 2017

Agenda Item 7

FIP INVESTMENT PLAN FOR BANGLADESH

PROPOSED DECISION

The FIP Sub-Committee, having reviewed the Document FIP/SC.19/7, *FIP Investment Plan for Bangladesh*, [endorses] the investment plan.

The Sub-Committee recognizes the extent to which the pledges by the contributing member countries to the FIP have been allocated, in line with its decision in May 2015. The Sub-Committee also notes that should resources become available following the implementation of the FIP pipeline management policy, these resources could be provided to the FIP new countries for implementation of their investment plans and the Sub-Committee will take a decision on allocation of these resources once they become available.

The Sub-Committee encourages the Government of Bangladesh and the MDBs to actively seek resources from other bilateral or multilateral sources to fund further development and implementation of the projects foreseen in the investment plan.

Government of the People's Republic of Bangladesh
Forest Investment Programme

2017

Forest Department
Ministry of Environment and Forests

Table of Contents

Abbreviations

Executive Summary

Chapter 1: Description of the Country and Sector Context

1.1 Background
1.2 Land Use Pattern in Bangladesh
1.3 Definition of Forests in Bangladesh
1.4 Forest Types
1.5 Trends in Area under Forests, Deforestation and Forest Degradation
1.6 Role of Agroforestry, Homestead Gardens and Private Plantations
1.7 Role of Coastal Mangroves
1.8 Afforestation, Reforestation and Coastal Mangrove Afforestation
1.9 CO_2 emissions from LULUCF (Land Use, Land-Use Change and Forest) Sector
1.10 Carbon Stocks in Forests and Trends
1.11 Drivers of Deforestation
1.12 Challenges for the Forest sector in Bangladesh
1.13 Objectives of Forest Investment Programme

Chapter 2: Identification of Opportunities for Greenhouse Gas Abatement

2.1 Introduction
2.2 Seventh (7th) Five Year Plan: Goals and Programmes
2.3 National Forest Policy 2016 (Proposed)
2.4 Forestry Master Plan (FMP)– 2016: Strategies and Targets
2.5 Country Investment Plan (CIP-2016–2021)
2.6 National Conservation Strategy (NCS)
2.7 INDC (Intended Nationally Determined Contributions)
2.8 Bangladesh Climate Change Strategy and Action Plan (BCCSAP)
2.9 UN-REDD Programme
2.10 Synthesis of the Proposed Programmes and Initiatives for the Forest Sector of Bangladesh
2.11 Common Programmes, Policies and Practices Across Eight Initiatives
2.12 Potential Investment Options for the FIP
2.13 Linking of Proposed Actions under FIP and Challenges Addressed: Theory of Change
2.14 Carbon Sequestration Potential of Proposed Projects under FIP

Chapter 3: Policy and Regulatory Environment

3.1 Introduction: Evolution of Forest Policies
3.2 The National Forest Policy in 1994
3.3 Draft Forest Policy 2016

3.3.1 Long term and short-term goals of the sector proposed in the Draft Forest Policy
3.3.2 Key forest policies related to climate change mitigation and adaptation
3.4 Implications of Draft National Forest Policy for Forest Investment Programme
3.5 7th Five Year Plan Polices for the Forest Sector
3.6 Relevance of National Agriculture and Land Use Policies
3.6.1 National Agriculture Policy
3.6.2 National Land Use Policy
3.7 Adequacy of the Existing Forest Policy, National Land Use Policy and National Agricultural policy
3.8 Polices for Transformational Change in the forest sector and implementation of FIP

Chapter 4: Expected Co-Benefits from FIP Investment

4.1 Introduction
4.2 Framework for assessment of co-benefits
4.3 Co-benefits of the FIP

Chapter 5: Collaboration among MDBs and other Partners

Chapter 6: Identification and Rationale for Projects to be Co-financed by FIP

6.1 Introduction
6.2 Main constraints and Potential Response Measures
6.3 Transformational Objective of FIP
6.4 Forest Investment Project: FIP - 1: Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests
6.4.1 Rationale of the Project
6.4.2 Challenges addressed
6.4.3 Transformational Objective of the Project
6.4.4 Linkage with Developmental Plans and Programs
6.4.5 Broad implementation area/region/zone of Project: FIP-1
6.4.6 Transformational Change from Project: FIP-1
6.4.7 Components of Project: FIP-1
6.4.7.1 Component – 1.1: Restoration/ reforestation of degraded and deforested hill forestlands
6.4.7.2 Component – 1.2: Community identification, engagement, capacity building etc. for hill forests
6.4.7.3 Component – 1.3: Management, monitoring logistics and maintenance
6.4.8 Budget of Project: FIP-1
6.5 Forest Investment Project (FIP-2): Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink
6.5.1 Rationale of the Project

6.5.2 Challenges Addressed
6.5.3 Transformational Objective of the Project: FIP-2
6.5.4 Linkage with Developmental Plans and Programmes
6.5.5 Broad Implementation Area/Region/Zone of Project – 2
6.5.6 Transformational Change from Project: FIP-2
6.5.7 Components of Project: FIP-2
6.5.7.1 Component 2.1: Private land restoration for enhanced carbon sequestration
6.5.7.2 Component 2.2: FENTC & SFPC renovation/temporary nursery establishment
6.5.7.3 Component 2.3: Capacity building of BFD frontier staffs and farmers
6.5.7.4 Component 2.4: Management and monitoring including logistics
6.5.8 Budget of Project: FIP-2
6.6 Forest Investment Project FIP-3: Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plain land Sal forest
6.6.1 Rationale of the FIP-3
6.6.2 Challenges Addressed Under FIP-3
6.6.3 Transformational Objective of FIP-3
6.6.4 Linkage with Developmental Plans and Programmes
6.6.5 Broad Implementation Area/Region/Zone of FIP-3
6.6.6 Transformational Change from FIP-3
6.6.7 Components of FIP-3
6.6.7.1 Component 3.1: Forestland survey and settlement of updated record
6.6.7.2 Component 3.2: Capacity building for survey, forestland record management and strengthening forestland litigation
6.6.7.3 Component 3.3: Project management, monitoring, logistics and maintenance
6.6.8 Budget of FIP-3

Chapter 7: Implementation Arrangement and Risk Assessment

7.1 Project Implementation Arrangements
7.2 Lessons learned from implementation of CRPARP and Wildlife projects
7.3 Capacity of the Implementing Agencies
7.4 Monitoring and evaluation of FIP
7.5 Risk Assessment

Chapter 8: Results Framework

8.1 FIP: Results Framework

References:
Annex: Comments and Suggestions from External Reviewer and Responses.

List of Tables

Executive Summary

Table 1: Recorded land use in deforested area (in 1000 ha) in Bangladesh during the period 1975 to 2014 (Reddy et al, 2016)
Table 2: Key drivers identified by different agencies/programmes
Table 3: FIP projects, components, total area and FIP component area and the total budget and the FIP component budget
Table 4: Potential sources of funding for projects under FIP (in USD)
Table 5: Outcome, Explanation and the Indicators of the Three Projects

FIP – Main Report

Table 1.1 Aerial extent of land use/land cover in Bangladesh in 2014 (Source: Reddy et al., 2016)
Table 1.2: Distribution of major forest types in Bangladesh (National Conservation Strategy Report, 2015)
Table 1.3: Annual net rate of deforestation (Mha) across forest types in Bangladesh (Reddy et al., 2016)
Table 1.4: Annual trends of forest change in Bangladesh (Reddy et al., 2016) over different periods
Table 1.5: Area under plantations (ha) according to FIGNSP, 2013 study
Table 1.6: Carbon dioxide emissions (Gg of CO_2) from LULUCF sector (Source: NATCOM, 2014)
Table 1.7: National level estimates of biomass carbon in Forest Department-managed forests in Bangladesh (Source: Mukul, et al., 2014)
Table 1.8: Total carbon density in major forest types in Bangladesh (Source: Mukul et al. 2014)
Table 1.9: Recorded land use in deforested area in Bangladesh during the period 1975 to 2014 (Reddy et al, 2016)
Table 1.10: Key drivers identified by different agencies/programmes
Table 1.11: Key direct and indirect drivers identified by UNREDD through stakeholder consultation according to major forest types
Table 2.1: Programmes, objectives and activities of the 7th Five Year Plan for forestry sector
Table 2.2: Proposed strategies, programmes and targets under Scenario 2 where additional funding will become available
Table 2.3: REDD+ related activities and programmes recommended under FMP
Table 2.4: The objectives of CIP relevant to forest sector (Source: CIP2016)
Table 2.5: Sub programmes under Country Investment Plan relevant to forest sector
Table 2.6: Financing of CIP and funding gap
Table 2.7: Key challenges and suggested actions under National Conservation Strategy
Table 2.8: Suggested recommendations to address the direct and indirect drivers of Deforestation and Forest degradation under the UN-REDD programme based on the stakeholder consultation
Table 2.9: Synthesis of the proposed major programmes under the seven major initiatives for the forest sector of Bangladesh

Table 2.10: Common set of proposed activities for FIP based on review of Eight National and International Forest Sector plans and initiatives
Table 2.11: Potential investment opportunities in forest sector
Table 2.12 Main project, components and Activities, targeted area for each activity and phasing of the activity
Table 2.13: Challenges, problems and limitations of the forest sector in Bangladesh and strategies for addressing them under FIP
Table 2.14: Carbon sequestration potential of proposed projects under FIP
Table 3.1: Implications of Draft National Forest Policy for FIP
Table 3.2: 7th Five Year Plan Policies and Programmes and their Implications for FIP
Table 3.3: Transformational policies required for meeting the broad goals for the forest sector.
Table 4.1: **Project FIP-1**: Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests. **C 1.1** Restoration/ reforestation of degraded and deforested hill forestlands
Table 4.2: **Project FIP-1**: Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests. **C 1.2** Community identification, engagement, capacity building etc., for hill forests
Table 4.3: **Project FIP-1**: Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests. **C 1.3**: Management, monitoring logistics and maintenance
Table 4.4: **Project FIP-2**: Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink **C 2.1** Private land restoration for enhanced carbon sequestration
Table 4.5: **Project FIP-2**: Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink **C 2.2** FENTC & SFPC renovation/temporary nursery establishment
Table 4.6: **Project FIP-2**: Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink **C 2.3** Capacity building of BFD frontier staffs and farmers
Table 4.7: **Project FIP-2**: Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink **C 2.4** Management & monitoring including logistics
Table 4.8: Project **FIP-3**: Project 3: Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plainland Sal forest
Table 6.1: Key challenges faced by the forest sector in Bangladesh and the potential responses

Table 6.2: Three FIP projects to promote forest sector transformational goal for Bangladesh
Table 6.3: Budget for Project FIP-1: Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests
Table 6.4: Budget for FIP-2: Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink
Table 6.5: Budget for FIP-3: Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plain land Sal forest
Table 7.1: Potential Risks and Mitigation measures
Table 8.1: Result Framework for FIP in Bangladesh

List of Figures

Figure 1: Trends in area under forests during the period 1975 to 2014, according to remote sensing data (Source: Reddy et al, 2016)
Figure 2: Trends in area under different forest types (‘000 ha) (Source: FRA, 2015 and FIGNSP, 2013)
Figure 1.1: People's Republic of Bangladesh (Source: www.maps.com))
Figure 1.2: Area under different land use categories in Bangladesh during 2011 (FAOStat 2015)
Figure 1.3: Forest Cover and Types (Source: BBS 2016)
Figure 1.4: Forest Area of Bangladesh by forest types (Source: NFA, 2007)
Figure 1.5: Trends in area under forests during the period 1975 to 2014, according to remote sensing data (Source: Reddy et al, 2016)
Figure 1.6: Trends in area under different forest types (‘000 ha) (Source: FRA, 2015 and FIGNSP, 2013)
Figure 1.7: Trends in forest cover of Bangladesh over different periods during 1930 to 2014 (Reddy et al, 2016)
Figure 1.8: Sundarban Mangrove Forest in Bangladesh (Source: MoEF, 2014)
Figure 1.9: Carbon stock (MtC) in biomass in major forest types of Bangladesh (a), and their relative contribution (b)
Figure 1.10: Soil organic carbon storage (MtC) in major forest types of Bangladesh (a), and their relative contribution (b)
Figure 6.1: Drivers of deforestation and forest degradation (Based on Chapter 1)
Figure 6.2: The broad transformational goals and objectives of forest sector
Figure 6.3: FIP 1: Transformational objective, project components and locations of Project FIP-1
Figure 6.4: FIP 2: Transformational objective, project components, project activities and locations of Project 2
Figure 6.5: FIP 3: Transformational objective, project components, project activities and locations of Project FIP-3
Figure 7.1: Project Implementation Arrangement for the FIP projects

ABBREVIATIONS

A& R: Afforestation and Reforestation
ACF: Assistant Conservator of forest
ADP: Annual Development Programs
ADB: Asian Development Bank
AIGA: Alternate Income Generation Activities
BAU: Business As-usual
BBS: Bangladesh Bureau of Statistics
BCCRF: Bangladesh Climate Change Resilience Fund
BCCSAP: Bangladesh Climate Change Strategy Action Plan
BFD: Bangladesh Forest Department
BFIDC: Bangladesh Forest Industries Development Corporation
BFRI: Bangladesh Forest Research Institute
BRAC: Bangladesh Rural Advancement Committee
BNH: Bangladesh National Herbarium
CBA: Community Based Adaptation
CBD: United Nations Conventions on Biological Diversity
CCA: Climate Change Adaptation
CCF: Chief Conservator of Forest
CCSAP: Climate Change Strategy Action Plan
CDM: Clean Development Mechanism
CO_2: Carbon Dioxide
CHT: Chittagong Hill Tract
CIP: Country Investment Plan
CMCs: Co-management Committees
CPF: Country Partnership Framework
CSOs: Central Statistics Office
CRPARP: Climate Resilient Participatory Afforestation and Reforestation Project
DP: Development Partners
DFO: Divisional Forest Officer
DFID: Department of International Development
DPD: Deputy Project Director
EBA: Ecosystem Based Adaptation
EFCC: Environment, Forestry and Climate Change
ES: Ecosystem Service
EX-ACT: Ex-Ante Carbon-balance Tool
FAO: Food and Agriculture Organization
FD: Forest Department
FIGNSP: Forest Information Generation and Networking Support Project
FIP: Forest Investment Program
FMP: Forestry Master Plan
FRA: Forest Resource Assessment
FYP: Five Year Plan
GoB: Government of Bangladesh
GDP: Gross Domestic Product
GHG ER: Greenhouse Gas Emission Reduction
GIS: Geographic Information System
GIZ: Deutsche Gesellschaft für Internationale Zusammenarbeit
HDI: Human Development Index
HHs: Households
IDA: International Development Association
ICR: Implementation Completion and Results Report
ICT: Information and Communication Technologies

IGO: Inter-governmental Organization
INDC: Intended Nationally Determined Contributions
IPAC: Integrated Protected Area Co-Management
IPCC: Inter Governmental Panel on Climate Change
IPF/IFF: Intergovernmental Panel on Forests/Intergovernmental Forum on Forests
IPM: Integrated Pest Management
IUCN: International Union for Conservation of Nature
JICA: Japan International Cooperation Agency
KOICA: Korea International Cooperation Agency
LULUCF: Land Use and Land Use Change Forests
MoEF: Ministry of Environment and Forests
M&E: Monitoring and Evaluation
MIS: Management information system
NBSAP: National Biodiversity Strategy and Action Plan
NCS: National Conservation Strategy
NFA: National Forest Assessment
NGO: Non-governmental Organization
NPD: National Project Director
NRM: Natural Resource Management
NTFP: Non-timber Forest Products
PA: Protected Area
PCCF: Principal Chief Conservator of Forest
PD: Project Director
PIC: Project Implementation Committee
PIU: Project Implementation Unit
PPCR: Pilot Program for Climate Resilience
PPP: Public Private Partnerships
PSC: Project Steering Committee
R & D: Research and Development
RCC: Roller-compacted concrete
REDD+: Reducing Emissions from Deforestation and Forest Degradation
RoR: Right of Record
RS: Remote Sensing
RIMS: Resource Information Management System
SCD: Systematic Country Diagnostic
SDG: Sustainable Development Goals
SEALS: Sundarban Environmental and Livelihoods Security
SFM: Sustainable Forest Management
SPCR: Strategic Program for Climate Resilience
SRF: Sundarban Reserve Forest
TA: Technical Assistance
TOF: Trees Outside Forests
TBD: To be Decided
UNCCD: United Nations Convention to Combat Desertification
UNDP: United Nations Development Program
UNFCCC: United Nations Convention on Climate Change
UNREDD: United Nations Reducing Emissions from Deforestation and Forest Degradation
USAID: United States Agency for International Development
USF: Unclassified State Forests
WRI: World Resource Institute
WBG: World Bank Group

Executive Summary

Country Context

Bangladesh has a population of about 160 million, and ranks 8thin the world in terms of population. It has one of the highest population densities in the world and is in a critical phase in its economic development. Bangladesh is predominantly agricultural, with two thirds of the population engaged in farming activities.

Bangladesh is frequently assessed to be one of the most vulnerable countries in the world to climate change because of its disadvantageous geographic location; flat and low-lying topography; high population density; high levels of poverty; reliance of many livelihoods on climate sensitive sectors, particularly agriculture and fisheries and inadequate institutional structures. Many of the adverse effects of climate change, such as sea level rise, higher temperatures, enhanced monsoon precipitation, and an increase in cyclone intensity, will exacerbate the existing stresses adversely impacting the development of Bangladesh, especially by reducing water and food security and damaging the infrastructure.

Climate change in Bangladesh could adversely affect forest ecosystems, biodiversity and even mitigation potential of forests. If forest cover decline continues, then the potential for forests to sequester carbon will be reduced over time. Thus, Bangladesh must address the challenge of climate change, vulnerability to extreme climate risks and depleting forest resources and carbon sink. FIP aims to reduce deforestation and forest degradation and enhance tree cover to conserve biodiversity, promote resilience to climate change and enhance ecosystem services, including carbon stocks.

Trends in Area under Forests, Deforestation and Forest Degradation

The area under forests in Bangladesh is estimated to be 2.6 million ha corresponding to 17.5% of the geographic area of the country. This includes 1.6 million ha of Forest Department controlled land and 0.73 million ha of Unclassified State Forests (USF), under the District Administration. Based on location and topography, forests in Bangladesh are classified as 'Hill' forests, plain land 'Sal' forests, mangroves, coastal plantation forests, fresh water swamp forests and village forests. The state forests are classified as Reserved Forests, Protected Forests, Acquired Forest, Vested Forest, and Private Forest. Besides, planted trees growing in villages, on marginal farm lands, croplands (agroforestry) and near homes as homestead garden account for significant area in the country.

There are varying estimates of trends in area under forests and rates of deforestation. According to estimates by Reddy et al., 2016, based on remote sensing data, forest area declined from 1.65 Mha in 1975 to 1.40 Mha in 2014 (Figure 1). The trends in area under mangroves, Sal, hill and bamboo forests are given in Figure 2. Primary forest land of the country gradually decreased from 1.49 million hectares in 1990 to 1.43 million hectares in 2015.At present, only 15% of the natural Sal forests in the plains and 11% of the natural hill forests are left in the country as is shown in Figure 2.

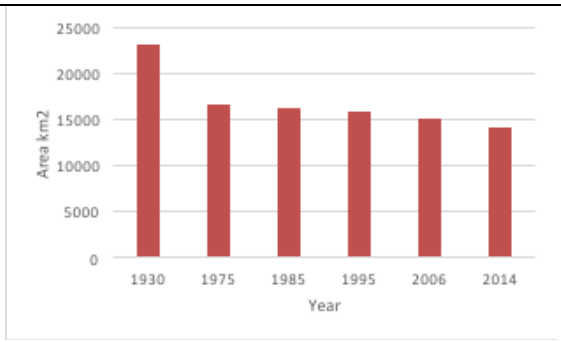


Figure 1: Trends in area under forests during the period 1975 to 2014, according to remote sensing data (Source: Reddy et al, 2016)

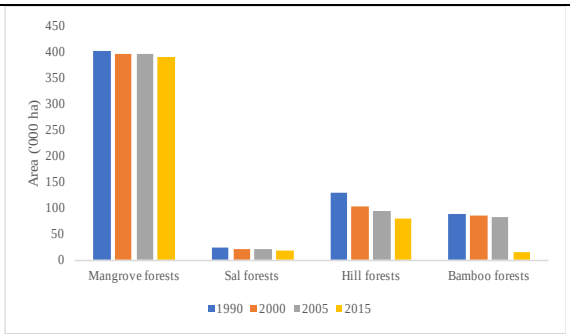


Figure 2: Trends in area under different forest types ('000 ha) (Source: FRA, 2015 and FIGNSP, 2013)

Annual gross rate of deforestation has been computed as 0.74% between 1930 and 1975, 0.53% during 1995-2006 and 0.75% during 2006-2014. The highest rate of deforestation was 0.75% during 2006-2014. Despite conservation policies, the trend of deforestation has continued, even showing an increasing trend in the recent past.

According to studies conducted by Reddy et al. (2016), the forest types show a negative change in forest canopy density, indicating forest degradation. Among forest canopy density categories, dense forests and open forests occupied 6,502 km^2 (46.2%) and 7,583 km^2 (53.8%) of total forest area of Bangladesh, respectively during 2014. During 1975, dense forests and open forests covered 51.3% and 48.7% of total forest area, respectively. The loss of an area of 2,002 km^2 (23.5%) of dense forest is recorded during 1975 to 2014. Annual rate of deforestation is high in dense forests as compared to open forests during 2006 to 2014, indicating increased threat to high biomass carbon forest ecosystems.

Thus, it could be concluded that forest loss continues in Bangladesh with higher rates of deforestation occurring during the recent decade of 2006 to 2014. Further, forest degradation (loss of tree canopy cover) also continues in Bangladesh. The FIP is aims to address deforestation and forest degradation, to increase carbon stocks, conserve biodiversity and improve livelihoods.

GHG Emissions

The LULUCF activities contribute to 20% of GHG emissions of Bangladesh. However, its contribution to global GHG emissions is low (<0.2%) (WRI 2014), Per capita CO_2 emissions are also one of the lowest in the world and were estimated at 0.37 metric tonnes of CO_2 in 2011 (World Bank 2014). There is no complete inventory for forest carbon estimation in Bangladesh. The latest assessment by the Food and Agriculture Organization of the United Nations (FAO) (i.e. Global Forest Resources Assessment 2010) reports 81 Mt carbon in living forest biomass in the country (FAO 2010). By contrast, Alamgir and Turton (2014) reported carbon density between 49-121 tonnes per hectare in the country's forests depending on the condition of the vegetation (e.g. open canopy versus closed canopy). Using carbon densities reported, the carbon stocks in Forest Department-managed forests is estimated to be between 98 and 240 Mt. The estimated carbon storage in soil (up to 30cm depth) in the country's forests is about 92.9 Mt (FAO 2007).

Drivers of Deforestation

It is observed that Bangladesh is experiencing forest loss and forest degradation. However, estimates according to UNFCCC definition of deforestation are not clear. The causes of deforestation and forest degradation in different forest types are very complex and diverse. Primarily, they are linked to the clearing of forest land, or the use of forest resources, for human settlement, agriculture, timber, fuelwood and housing materials. Unsustainable and inappropriate forest management practices, as well as natural disturbances play a significant role in determining the changed composition and degradation of forests. Thus, the causes of deforestation and degradation are both human and natural. There are several assessments of drivers and causes of deforestation and degradation. The assessment by the UNREDD project is based on multi-stakeholder consultations.

Quantitative estimates of major drivers of deforestation in Bangladesh: Remote sensing based quantitative estimates of the major drivers of deforestation are given in Table 1, based on a study by Reddy et al, 2016. In this study, deforestation is considered as replacement of native forest by other land use and/or reduction of forest canopy cover to less than 10 percent. Table 1 provides information on conversion of forest land to other purposes. It can be observed that during the 40-year period of 1975 to 2014, 25% of deforested area was converted to agriculture and about 58% was converted to scrub. However, during the recent period of 2006 to 2014, it can be observed that 34% of deforested land was converted to agriculture and 35% of land was converted to scrub land. This indicates that the two major drivers of deforestation are:

- Conversion of forest land to agriculture
- Conversion of forest land to scrub land, indicating unsustainable logging of trees.

Table 1: Recorded land use in deforested area (in 1000 ha) in Bangladesh during the period 1975 to 2014 (Reddy et al, 2016)

Forest to other land use	**1930-2014**		**1975-2014**		**1985-2014**		**1995-2014**		**2006-2014**	
	Area	**%**	**Area**	**%**	**Area**	**%**	**Area**	**%**	**Area**	**%**
Agriculture	2249	24.8	705	24.9	566	23.9	498	26.9	336	33.9
Scrub	3955	43.7	1634	57.7	1481	62.7	1151	62.2	528	53.3
Plantations	1531	16.9	272	9.6	142	6	107	5.8	73	7.4
Others	1325	14.3	224	7.8	176	7.4	95	5.1	54	5.4
Total	9060	100	2835	100	2365	100	1851	100	991	100

Drivers identified by different agencies and programmes:

A number of reports, programmes and studies have identified the main causes or drivers of deforestation and forest degradation in Bangladesh. Some of the key drivers from different reports are presented in Table 2, including the drivers identified under the UNREDD program through stakeholder consultation.

Table 2: Key drivers identified by different agencies/programmes

Agency/Programme/Report	***Key Drivers***
Country Investment Plan	1. Encroachment of forest land due to insufficient demarcation of boundaries and improper land records 2. Increase in demand for forest products 3. Salinity intrusion in natural forests 4. Weak enforcement of forest laws
National Conservation Strategy	1. Increase in pressure on forests and homesteads for forest products 2. Forest encroachment, illegal logging 3. Imbalance in forest products supply and demand 4. Land tenure issues 5. Weak institutional capacities, poor governance, weak law enforcement
Forestry Master Plan	1. Absence of forest boundaries, maps, land records 2. Limitation in forest department staff, lack of capacity, trained manpower 3. Over exploitation of forest products 4. Illegal tree felling 5. Encroachment of forest land for agriculture and other purposes 6. Poor financing or investment
Bangladesh Delta Plan	1. Conversion of forest land to agriculture 2. Urbanization/Industrialization 3. Demand for fuel and firewood 4. Illicit felling of trees 5. Encroachment of forest land 6. Lack of policies 7. Non-sustainable forest management 8. Exotic rubber plantations
UNREDD (Direct drivers)	**Hill Forests**: Illegal logging, Unsustainable logging practices, Shifting cultivation, Conversion of forest land to agriculture purposes, plantations, Forest clearances, Infrastructure development and Urbanization **Sal Forests**: Homestead agroforestry and agriculture, Illegal logging, Overlapping /unclear jurisdictions, Demand for land settlement and agriculture, Demand for industrial land, Infrastructure development Lack of alternate livelihood opportunities **Natural mangroves:** Illegal logging, Demand of forest land for agriculture and homestead development

Challenges facing the forest sector: Forest Department under the Ministry of Environment and Forest is the main agency having a mandate for management, conservation and sustainable development of all types of forests in Bangladesh. Two of the key drivers of deforestation and degradation identified in the previous section relate to inadequate investment and capacity of the BFD. Some of the main challenges faced by the forest sector and the forest department are as follows:

Main challenges of the forest sector are as follows:

1. Low area under forest
2. Low quality of forest; low crown cover, biomass density and biodiversity
3. Over-exploitation of the forest resources
4. Large scale illicit removal of timber and other forest resources

5. Pressure on forest land for many purposes leading to illegal encroachment and official conversion of forest land to commercial land
6. Increase in demand for fuelwood, timber and industrial wood
7. Low investment in forest sector

Institutional challenges for the forest sector and department are as follows:

1. Absence of demarcation of forest land and boundaries
2. Inadequate staff in the forest department and inadequate training and capacity
3. Inadequate infrastructure, legal support for enforcing forest laws and for undertaking conservation and afforestation
4. Lack of research capacity
5. Inadequate financing

Polices for Transformational Change in the forest sector and implementation of FIP

The transformational change in forest sector would involve the following key components; many of them will be addressed in the FIP.

- Forest Policy, 1994 and 7th Five Year Plan target achieving 20% of land area under forest or tree cover and forests to have 70% crown density - (FIP-1 and 2)
- Halting deforestation or conservation of all existing natural forests - (FIP-3)
- Meeting all the biomass (fuelwood, timber, pulpwood, etc.) needs from plantations, tree plantations/agroforestry in fallow and marginal lands, homestead gardens, etc. - (FIP-2)
- Reclaiming Sal and CHT, through natural regeneration and protection to promote biodiversity and ecosystem services.
- Promotion of climate resilient afforestation/reforestation practices along with AIG (Alternate Income Generation) activities to enhance the resilience of forest dependent communities - (FIP-1)

The big challenge is to identify the transformational policies required to promote the above goals to achieve transformational change in forest sector. Infact, the Forest Policy of 1994 and the new Draft Forest Policy 2016 have many provisions, but are not backed by adequate legislations or acts and adequate authority to the forest department to enforce the policies.

Transformational Objective of FIP

From the Forest Policy of 1994 to the 7th Five Year Plan, Bangladesh forest sector had a goal to increase the forest cover upto 20% by 2020 and to conserve all the existing natural forests and biodiversity. However, deforestation and forest degradation continues due to various factors explained in Section 6.1 and Chapter 1. Thus, there is a need for transformational change in forest sector to save the very limited area under natural forests and to expand the forest area to meet the growing biomass needs for economic development. The transformational goal proposed in this FIP is as follows:

"To conserve the existing forests and reduce emissions from deforestation and forest degradation, to contribute to expansion of the forest cover towards the goal of 20% of the geographic area, mainly through climate resilient forest restoration, A&R and planting TOF, to conserve and restore forests and to enhance forest carbon sink and diversify and improve the livelihoods of forest dependent communities, to meet the growing needs of biomass, through increased investment, strengthened forest department, local institutions and community participation"

The FIP has 3 broad transformational objectives and projects linked to achieve the transformational goal set for the sector and to meet the targets set out in the 7th Five Year Plan, CIP, draft National Forest Policy and FMP. The broad transformational objectives are presented here.

Three FIP projects to promote forest sector transformational goal for Bangladesh

1	*To promote* "Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests"
2	*To promote* "Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink"
3	"Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plain land Sal forest"

The three FIP projects, the components, the total area proposed and the FIP component area and the budget are presented in Table 3.

Table 3: FIP projects, components, total area and FIP component area and the total budget and the FIP component budget

Project	Components	Total Area (FIP Area)/Total Unit (FIP Unit)	Total Budget (In Million US$) (FIP Budget)
1.Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests	1.1 Restoration/ reforestation of degraded and deforested hill forestlands	52600 ha (16075 ha)	57.561(17.742)
	1.2 Community identification, engagement, capacity building etc. for hill forests	15000 hhs (5000 hhs)	16.641(5.883)
	1.3 Management, monitoring logistics and maintenance	52600 ha (16075 ha)	2.750 (1.375)
			76.952(25.000)
2.Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink"	2.1 Private land restoration for enhanced carbon sequestration	18000 ha (18000 ha.)	19.350(19.350)
	2.2 FENTC & SFPC renovation/temporary nursery establishment	50 Nos.	0.813(0.813)
	2.3 Capacity building of BFD frontier staffs and farmers	200 Persons	1.038(1.038)
	2.4 Management & monitoring including logistics		3.800(3.800)
			25.000(25.000)
3. Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plain land Sal forest	3.1 Forestland survey and settlement of updated record	Total area 125,240 ha (FIP: 24,969 ha.) AIGAs: 15000 hhs (FIP: 3000 hhs)	104.555 (20.875)
	3.2 Capacity building for survey, forestland record management and strengthening forestland litigation	600 FD Officials (200 Officials)	1.625(1.375)
	3.3 Project management, monitoring, logistics and maintenance	AIGAs: 15000 hhs (FIP: 3000 hhs)	11.000(2.750)
			117.180(25.000)

Co-benefits, including Carbon sequestration benefit, of FIP

All the proposed projects under the FIP incorporate the following critical principles to ensure delivery of sustained environmental, climate resilience, socio-economic and institutional co-benefits, along with mitigation of climate change through carbon sink expansion.

- **Environmental Co-benefits**: Conservation of carbon sink and enhancement of carbon stocks, synergistically contributing to conservation of biodiversity, protection of watersheds and reclamation of degraded forests and lands.
- **Socio-economic Co-benefits:** All FIP activities will provide multiple forest products, income and employment generation benefits, contributing to enhancement of livelihoods. Further, through AIGAs for forest dependent communities, incomes sources could be diversified.
- **Institutional Co-benefits:** All the three proposed projects and components are expected to strengthen the forest departments and NGOs and build capacity in BFD, NGOs and local community institutions.
- **Climate resilience**: All the FIP activities incorporate climate resilience practices to ensure sustained carbon mitigation benefit; through promotion of multi-species and native species dominated forestry, fire protection and management, anticipatory planting of tree species, linking forest fragments, creation of corridors, etc.
- **Carbon sequestration benefit**: The net carbon sequestration benefits estimated using EXACT tool for a period of 20 years is 7.59 $MtCO_{2\text{-}eq}$ for the 16,075 ha considered under Project FIP-1. Similarly, the net carbon sequestration benefit estimated for Project FIP-2 (Trees outside Forests) is 8.51 $MtCO_{2\text{-}eq}$, considering an area of 18,000 ha. FIP-3 where 24,969 ha will be subjected to protection due to secure land tenure and digitization, which is projected to lead to conservation of Carbon sink of 4.72 $MtCO_2$-eq.

Collaboration among MDBs and other Partners

Bangladesh is a developing country and it is also one of the most vulnerable countries to climate change risks. Bangladesh is one of the largest recipients of the international financial assistants from both multilateral and bilateral agencies for programmes aimed at poverty elevation, adaptation to climate change, forest sector and infrastructure development. Bangladesh also has set up coordinating agencies for managing financial support from multiple donors and aid agencies.

A number of international agencies such as USAID, IUCN, JICA, DFID, GIZ, and agencies of UN Systems (FAO, UNDP, UNEP, etc.) are collaborating with the Forest Department of Bangladesh. While these agencies are providing technical assistance, Asian Development Bank and World Bank, etc. are providing investment finance for this sector. These agencies are cooperating with the Forest Department and assisting to undertake development projects to achieve internationally agreed development goals, including the Millennium Development Goals and commitments of Multilateral Environmental Agreements such as CBD, UNFCCC, UNCCD, Ramsar, etc. Two of the major projects funded/ coordinated by World Bank for the forest sector recently include "Climate Resilient Participatory Afforestation-Reforestation Program" (CRPARP) and "Strengthening Regional Cooperation for Wildlife Protection in Asia Project".

Bangladesh has vast experience in implementing externally aided projects, Bangladesh also has adequate institutional arrangements to coordinate, plan, implement and monitor developmental projects in the environment, forests and climate change sectors. Bangladesh has BCCRF as an umbrella organization to coordinate funding from multiple agencies. The CIP of Bangladesh also provides Framework for implementation and monitoring of forest and climate change projects. World Bank has a large "Sustainable Forests and Livelihood" project in the pipeline. Thus, FIP will be adequately coordinated and supported by multiple multilateral and bilateral agencies. Need to explore multiple sources for supporting the 3 projects under FIP.

Project Implementation Arrangements

The main implementing agency for all the three projects under FIP will be the BFD, under the Ministry of Environment and Forests (MoEF). BFD will nominate a National Project Director (NPD) to head the Project Management Unit (PMU). Under the control of PMU, three Deputy Project Directors (DPDs) will be appointed by the MoEF for implementing the three projects proposed under the FIP- IP for Bangladesh. All the DPDs will coordinate with NPD to implement their respective projects. The NPD will be guided by the Chief Conservator of Forests (CCF), BFD. MoEF will form a Project Steering Committee (PSC) chaired by the Secretary, MoEF and a Project Implementation Committee (PIC) chaired by the CCF by following the prescribed format of the Planning Commission. Members of the committees will be represented by the line ministries, associate agencies, NGOs and all relevant stakeholders including the NPD, DPD, concerned officials of BFD, and the representative of the Project Financing Agencies. The NPD has the full responsibility for the successful implementation of all the projects. NPD will coordinate with other DPDs for developing the detailed project implementation plan, implementation of the projects, administration and finance management and finally coordinating, monitoring, evaluation and reporting activities. Necessary technical, financial and administrative staffs will be recruited under the PMU for smooth implementation of the project and satisfactory financial management of the projects.

Outcome, Indicators and Result Framework

The outcome, explanation for the outcome and the indicators are presented in the Table 5.

Table 5: Outcome, Explanation and the Indicators of the Three Projects

Project 1: Transformational Outcome - To promote "Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance Carbon Sequestration, Resilience to Climate Change and Biodiversity Conservation and Improved Livelihoods in Hill forests"		
Outcome/ Impact	*Explanation*	*Indicators*
Carbon sequestration in the hill forests	This outcome leads to increase in carbon stocks in degraded forests and deforested areas due to restoration and reforestation	1. Tonnes of biomass carbon and soil carbon stocks enhanced compared to baseline in - Degraded hill forest lands - Deforested hill forest lands
Biodiversity conservation	Biodiversity of the deforested lands and degraded forest lands will be enhanced through promotion of natural regeneration,	1. Biodiversity index 2. Number of tree species 3. Percent of native tree

	planting of multi-species and native species	species planted
Enhanced climate change resilience	Climate change is projected to impact degraded forests, fragmented forests and biodiversity poor forests. Thus, through forest restoration using multispecies and native species, climate resilience of restored forest areas will be enhanced	1. Percent of native tree species in the afforested area 2. Forest fragmentation index 3. Biodiversity index 4. Per cent of Native tree species
Project 2: Transformational outcome – "Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink"		
Outcome/ Impact	*Explanation*	*Indicator*
Carbon sequestration through expanding forest area by planting trees (TOFs) in crop lands, private lands and homesteads	This project will increase tree cover on farmlands and homesteads and sequester carbon in the private lands. Further, increased supply of fuelwood and timber from private lands will reduce pressure of deforestation and forest degradation in the public lands/forest lands.	1. Tonnes of biomass carbon and soil carbon stocks enhanced compared to baseline in - marginal crop lands / fallow lands - homestead gardens
Improved livelihoods by planting economically valuable tree species on private lands; farm lands and homesteads	This project will improve livelihoods at local level by planting economically valuable tree species which provide fruits, nuts, leaves, fuelwood, timber, etc. which can be used by the households or marketed.	1. Number of days of employment generated for timber, fuelwood, etc. production, extraction, processing and marketing. 2. Tonnes of fuelwood and timber harvested annually.
Meeting biomass demands of households and industries	The project aims at meeting biomass demands by production and enhancing supply of timber and forest products to meet household and industrial demands from private lands.	1. Tonnes of fuelwood, timber, etc. harvested from croplands and homestead gardens.
Project 3: Transformational Outcome - "Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance Carbon sink conservation and sequestration in hill forests and plainland Sal forest"		
Outcome/ Impact	*Explanation*	*Indicator*
Securing forestland through physical survey and boundary demarcation. Facilitating reduction in Carbon emissions from deforestation and forest degradation and Carbon sequestration through reduced pressure on forests.	1. Land survey, fixing boundaries and demarcation and digital map preparation will facilitate forest protection and reduced pressure on public forest land. This will enable BFD to enforce forest laws, which ban encroachment. This will lead to reduced Carbon emissions from deforestation and forest degradation.	1. Area of forest land surveyed and mapped 2. Reduction in the number of land disputes 3. Reduction in forest land encroachment 4.Number of maps prepared.
Capacity building for survey, forestland record management and strengthening forestland litigation resolution	1. Strengthened forest department staff with additional tools and methods are expected to enforce forest laws which ban forest encroachment.	Number of forest department staff trained in land survey, mapping and digitization Number of maps prepared. 3. Area demarcated or surveyed

Chapter 1: Description of the Country and Sector Context

1.1 Background

Bangladesh lies in the north-eastern part of South Asia and it shares boundary with India on the west and north side, with Burma on the south-east, and on the south with Bay of Bengal (Figure 1.1). It has one of the largest deltas in the world, which is formed by a dense network of distributaries of the rivers: Ganges, Brahmaputra, Meghna and more than 230 rivers and their tributaries and distributaries. The geographic area of Bangladesh is 14.76 million hectares (Mha) and the land is mostly low and flat land. 80% of the land is flood plain and only in the extreme northwest, the elevations exceed 30 meters.

Figure 1.1: People's Republic of Bangladesh (Source: www.maps.com)

Bangladesh has a population of about 160 million, and ranks 8th in the world in terms of population. It has one of the highest population densities in the world and is in a critical phase in its economic development. Bangladesh's population grew from a little over 50 million in 1961 to over 157 million in 2015. The current annual population growth rate is 1.2% (i.e. approximately 1.88 million people annually). It is projected that by 2025, the population could be around 178 million and by 2050 it could be around 202 million. Bangladesh is predominantly agricultural, with two thirds of the population engaged in farming activities, although it should be noted that more than three quarters of Bangladesh's export earnings come from the garment industry.

In terms of climate, Bangladesh is characterised by high temperatures, heavy rainfall, high humidity, and fairly marked seasonal variations. The climate of Bangladesh is largely tropical for most of the year, generally warm, almost uniformly humid throughout the year. The exposure of Bangladesh to various climate hazards such as floods, cyclones, and other natural disasters is higher due to its high population and population density.

According to National Conservation Strategy Report, (Rahman, 2016) the area under forests in Bangladesh is estimated to be 2.6 million ha corresponding to 17.5% of the geographic area of the country. This includes 1.6 million ha of Forest Department controlled land and 0.73 million ha of Unclassified State Forests (USF), under the District Administration. Based on location and topography, forests in Bangladesh are classified as 'Hill' forests, plain land 'Sal' forests, mangroves, coastal plantation forests, fresh water swamp forests and village forests. The state forests are classified as Reserved Forests, Protected Forests, Acquired Forest, Vested Forest, and Private Forest. Besides, planted trees growing in villages, on marginal farm lands, croplands (agroforestry) and near homes as homestead garden account for significant area in the country. There are multiple estimates of area under forests and the definition of forest used, is often different.

The forest sector accounts for about 3% of the country's gross domestic product (GDP) and 2% of the labour force. This however is an underestimate of the over-all economic and social importance of forests. The GDP figure does not account for the large quantities of fuelwood, fodder, small timber and poles, thatching grass, medicinal herbs, and other forest produce, extracted legally and illegally. If the value of forest ecosystem services such as non-timber forest products (NTFPs), value of recreation and carbon locking is considered, the contribution of forestry sector could be as high as 6.4% of the national GDP in2014-2015 ((Rahman, 2016)). Owing to factors such as over exploitation, conversion of forestland into agriculture, fire and grazing, forest resources in Bangladesh have been continuously depleting in terms of both area and quality. Between 1990 and 2015, Bangladesh annually lost 2,600 hectares of primary forest (FAO, 2016). Primary forest land gradually decreased from 1.49 million hectares in 1990 to 1.43 million hectares in 2015. Thus, annual rate of deforestation in Bangladesh was 0.2% during 1990-2015 ((FAO, 2016).

The role of forests in poverty alleviation is also critical. In 2015, employment in forestry sector was about 1.5 million full time equivalent - of which 0.60 million were women. There are at least 19 million people depending on forests directly for their livelihoods in Bangladesh. There could be a similar number of people who are dependent for their livelihood on forests indirectly. According to National Conservation Strategy Report, 2016 the contribution of village forests to total household income varied from 8.9% to 18.6%. Finally, forests are the reservoirs of both plant and animal biodiversity.

Bangladesh has realized the importance of forestry and the 7^{th} Five Year Plan has set a goal to "achieve tree cover of 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)"

Sundarbans: Bangladesh is home to Sundarbans, the largest mangrove forest in the world with an area of 6,017 km^2 in Bangladesh and 4,000 km^2 in India. Sundari (*Heriterafomes* Buch. -Ham.) is the most dominant (70%) species from which the name "Sundarban" is derived. Sundarban is a World Heritage and Ramsar site, which accounts for 44% of Bangladesh forests. In 1875, Sundarbans was recognized as the first state owned reserve forest and the first working plan came into force in 1893. Sundarbans provide a unique ecosystem that has a significant role in socio-economic development of the neighbouring communities and the country by providing a wide range of Ecosystem Services (ES) which include timber, fisheries and other NTFPs. Finfish, crustaceans and honey are the major food products from Sundarbans.

Climate change and vulnerability of Bangladesh: Bangladesh is frequently assessed to be one of the most vulnerable countries in the world to climate change because of its disadvantageous geographic location; flat and low-lying topography; high population density; high levels of poverty; reliance of many livelihoods on climate sensitive sectors, particularly agriculture and fisheries and inadequate institutional structures. Many of the adverse effects of climate change, such as sea level rise, higher temperatures, enhanced monsoon precipitation, and an increase in cyclone intensity, will exacerbate the existing stresses adversely impacting the development of Bangladesh, especially by reducing water and food security and damaging the infrastructure.

Climate change in Bangladesh could adversely affect forest ecosystems, biodiversity and even mitigation potential of forests. If forest cover decline continues, then the potential for forests to sequester carbon will be reduced over time. Thus, Bangladesh must address the challenge of climate change, vulnerability to extreme climate risks and depleting forest resources and carbon sink. FIP aims to reduce deforestation and forest degradation and enhance tree cover to conserve biodiversity and enhance ecosystem services, including carbon stocks and livelihoods.

1.2 Land Use Pattern in Bangladesh

FMP (1992) compiled earlier assessments for the period 1985 to 1988 with local information and presented forest land use for the reference year 1986. During 1999, the FRA (2000) (Nations, 2000) programme of FAO has similarly compiled the latest information available for 1996 for national land use in Bangladesh. Figure 1.2 shows the extent of various land use categories in Bangladesh in 2011. Nearly 65% of the area of the country is arable cropland, while 15.7% area is under forest and wilderness (including permanent meadows).

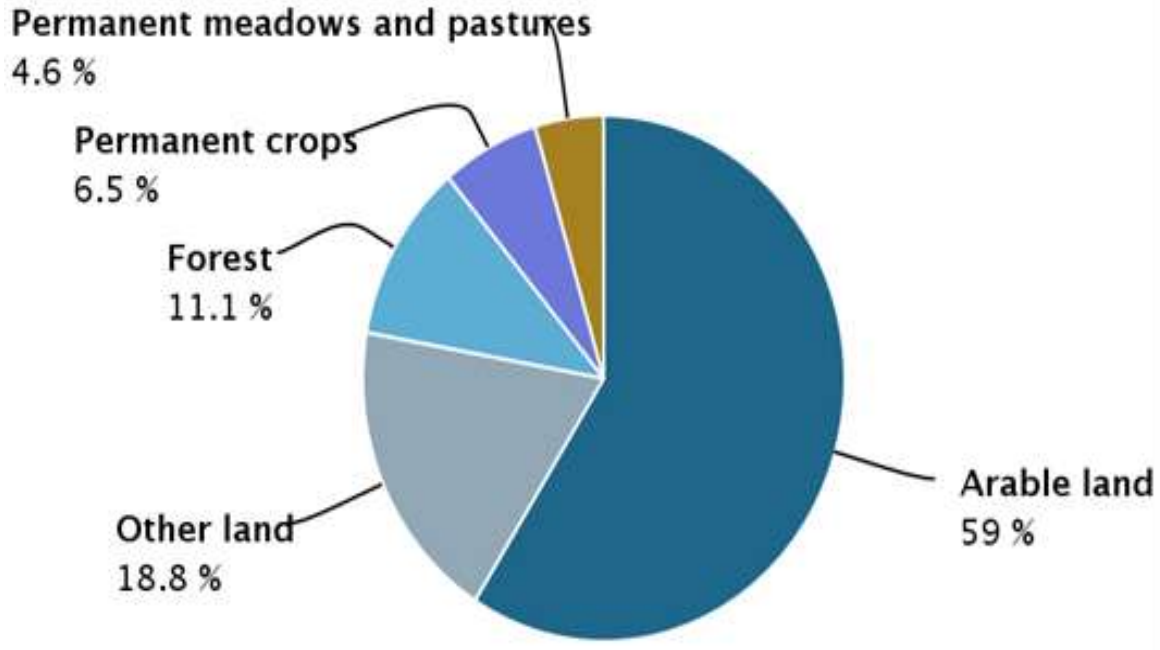


Figure 1.2: Area under different land use categories in Bangladesh during2011 (FAOStat 2015)

The Land Use Pattern in Bangladesh according to a remote sense based estimate during 2014is given in Table 1.1 . According to this estimate, forests account for only 9.5% of geographic area, with scrub accounting for 3.2% and plantations accounting for 12.2% (this

may include non-forest plantations also). Thus, there are different estimates of land use pattern in Bangladesh.

Table 1.1 Aerial extent of land use/land cover in Bangladesh in 2014(Source: Reddy et al., 2016(Reddy, Pasha, Jha, Diwakar, & Dadhwal, 2016)*)*

	Area (km^2)	% of total geographic area
Forest	14086	9.5
Scrub	4745	3.2
Grassland	556	0.4
Plantation	18059	12.2
Agriculture	91716	62.2
Wetlands	2441	1.7
Water	13136	8.9
Barren land	1188	0.8
Settlements	1643	1.1
Grand total	147570	100

1.3 Definition of Forests in Bangladesh

According to FAO (2015) (FAO, 2015), forests in Bangladesh is defined as "Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10%, or trees able to reach these thresholds *in situ*". It does not include land that is predominantly under agricultural or urban land use. Forest is determined both by the presence of trees and the absence of other predominant land uses. Areas under reforestation that are expected to reach a canopy cover of 10% and a tree height of 5 m are included as areas which are temporarily un-stocked as a result of human intervention or natural causes, which are expected to regenerate into forests. It includes: areas of bamboo and palm, provided that height and canopy cover criteria are met; forest roads, firebreaks and other small open areas; forest in national parks, nature reserves and other protected areas such as those of specific scientific, historical, cultural or spiritual interest; windbreaks, shelterbelts and corridors of trees with an area of more than 0.5 ha and width of more than 20 m; plantations primarily used for forestry or protective purposes, such as rubber-wood plantations. This excludes tree stands in agricultural production systems, for example, fruit plantations and agroforestry systems, trees in urban parks and gardens.

1.4 Forest Types

The forests of Bangladesh are broadly classified into three categories based on the topographic conditions (a) Hill forests, (b) Plain Sal forests, and (c) Mangrove Littoral forests (Figure 1.3 and Figure 1.4). The hill forests contain most of the productive forest areas of Bangladesh. The Hill forests account for 0.67 million ha followed by the Littoral Mangrove Forests and Coastal Afforestation extending over 0.60 and 0.19 ha, and Plain Sal Forest account for about 0.12 million ha followed by others such as Unclassified State forests (0.73 million ha), swamp and village forests consisting of 0.02 and 0.27 million ha of forest area, respectively (Table 1.2).

Table 1.2: Distribution of major forest types in Bangladesh (National Conservation Strategy Report, 2015(Rahman, 2016)*)*

Forest type	Location	Area (million hectares)	Remarks
Hill Forest	Eastern part extending over Sylhet, Habiganj, CHT, Chittagong and Cox's Bazar	0.67 (26.38%)	Under the control of Forest Department; Major produce: Large saw log, poles, firewood, thatching material and bamboo
Natural Mangrove (Sundarban)	South-west in Khulan, Bagerhat and Satkhira	0.60 (23.62%)	Includes 0.17 million ha water area; Major produce: timber, poles, firewood, pulpwood, thatching material
Mangrove Afforestation	Along the Coastal zone	0.19 (5.48%)	Major produce: firewood, pulpwood
Sal Forest	Chiefly in the Central region in Gazipur, Tangail, Comilla, Sherpur and Mymensingh. Small patches also found to occur in Dinajpur, Rangpur, Thakurgaon, Naogaon and Panchagarh in the north-west region	0.12 (4.73%)	Indigenous Sal and plantation of short rotation exotics for poles, posts and firewood.
Un-classified State Forest (USF)	Hill tract districts	0.73 (28.74%)	Under the control of district councils subject to shifting cultivation. Major produce: bamboo, thatching material and firewood
Swamp Forest	Mainly in Sylhet and Sunamganj district in the north-eastern part	0.02 (0.42%)	Hijal (*Barringtoniaacutangula*) and Koroch (*Pongamiapinnata*) are the main species of the forest. The swamp forests support fresh water fisheries and are vital spawning grounds
Village Forests	Scattered throughout the country mostly on the homestead land	0.27 (10.63%)	Almost all the village area (2.86 million ha) is covered by trees of varying density. Major produce: timber, bamboo, poles, posts and firewood
	Total	2.6 (100%)	

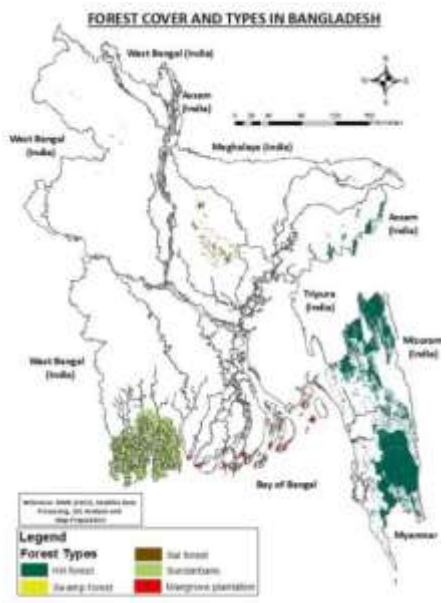


Figure 1.3: Forest Cover and Types (Source: BBS 2016)

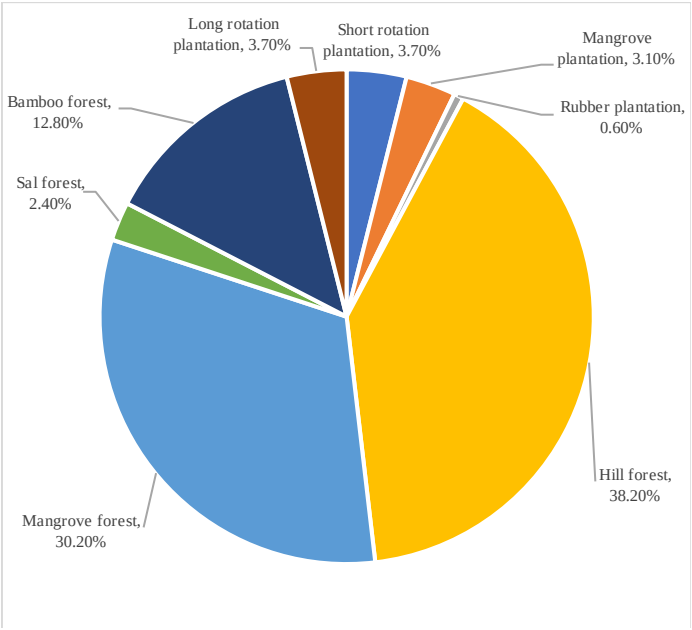


Figure 1.4: Forest Area of Bangladesh by forest types (Source: NFA, 2007)

However, Bangladesh has trees outside forests (TOF), which meets most of the timber and fuelwood needs of the country. The area under TOF, mostly in the form of homestead forests and cultivated lands was estimated to be nearly 1.7 million ha in 2005 (NFA 2005-07) (Altrell, Saket, Lyckebäck, & Piazza, 2007). Privately owned village forests, also known as homestead forests totaling an area of 0.27 million hectares is also included. Apart from the notified forest in the custody of the Bangladesh Forest Department (BFD), there are nearly 695,000 ha of Un-classed State Forest (USF) in the Chittagong Hill Tracts (CHT) districts, which is mostly degraded due to shifting cultivation and other factors. Of the total forest area, 84% has been classified as natural forest and nearly 16% as plantation forest. The two most common types of forest, namely Hill forest and Mangrove forest cover more than 68% of total forest area (NFA, 2007) (Altrell et al., 2007).

1.5 Trends in Area under Forests, Deforestation and Forest Degradation

There are varying estimates of trends in area under forests and rates of deforestation. According to estimates by Reddy et al., 2016 (Reddy et al., 2016), based on remote sensing data, forest area declined from 1.65 Mha in 1975 to 1.40 Mha in 2014 (Figure 1.5).

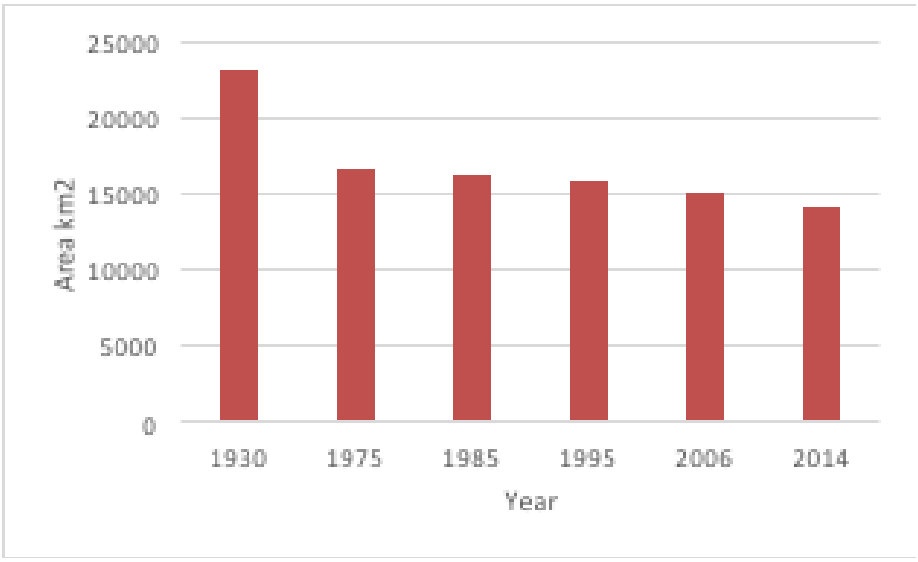


Figure 1.5: Trends in area under forests during the period 1975 to 2014, according to remote sensing data (Source: Reddy et al, 2016)

The trends in area under mangroves, sal, hill and bamboo forests are given in Figure 1.6. Primary forest land of the country gradually decreased from 1.49 million hectares in 1990 to 1.43 million hectares in 2015. At present, only 15% of the natural Sal forests in the plains and 11% of the natural hill forests are left in the country as is shown in Figure 1.6.

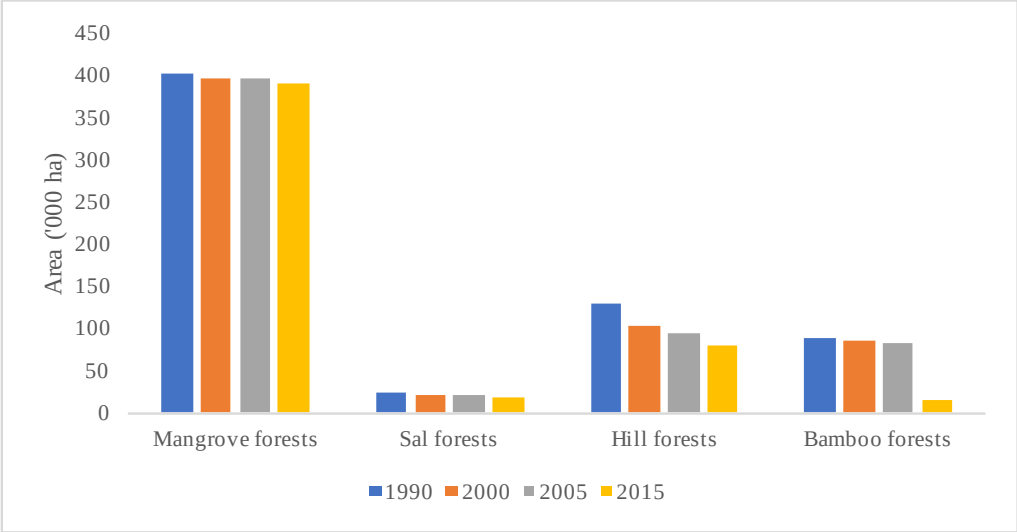


Figure 1.6: Trends in area under different forest types ('000 ha) (Source: FRA, 2015 and FIGNSP, 2013)

The Bangladesh forest landscape is mostly covered with moist deciduous forests. There is a substantial change in the forest types of Bangladesh in the last few decades. Large extent of forest area is being depleted, especially in the semi evergreen, moist deciduous and dry deciduous forest regions. According to studies conducted by Reddy et al. (2016) (Reddy et al., 2016), the forest types show a negative change in forest canopy density. 56.4% of semi-evergreen forests are lost followed by moist deciduous forests (51.5%) and dry deciduous

forests (43.1%) during the period 1930 to 2014. Annual net rate of deforestation across forest types in Bangladesh is given in Table 1.3.

Table 1.3: Annual net rate of deforestation (Mha) across forest types in Bangladesh (Reddy et al., 2016)

Time period	Semi evergreen	Moist deciduous	Dry deciduous	Mangroves
1930-1975	1.07	1.09	0.75	0.25
1975-1985	0.42	0.33	0.30	0.00
1985-1995	0.55	0.55	0.37	0.00
1995-2006	1.07	0.75	0.65	0.00
2006-2014	1.64	0.77	1.03	0.05

During the past eight decades, the mangroves decreased by 292 km^2 (6.5%) of area. Among forest canopy density categories, dense forests and open forests occupy 6,502 km^2 (46.2%) and 7,583 km^2 (53.8%) of total forest area of Bangladesh, respectively during 2014. During 1975, dense forests and open forests covered 51.3% and 48.7% of total forest area, respectively. The loss of an area of 2,002 km^2 (23.5%) of dense forest is recorded during 1975 to 2014. Annual rate of deforestation is high in dense forests as compared to open forests during 2006 to 2014, indicating increased threat to high biomass forest ecosystems.

The annual trends of forest change in Bangladesh over the past few decades are presented in Table 1.4 and also shown in Figure 1.7. Annual gross rate of deforestation has been computed as 0.74% between 1930 and 1975. The annual rate of deforestation indicates gross loss of 0.53% during 1995-2006 and 0.75% during 2006-2014. The highest net annual rate of deforestation was 0.75% during 2006-2014. Despite conservation policies, the trend of deforestation has continued, even showing an increasing trend in the recent past. Thus, it could be concluded that forest loss continues in Bangladesh with higher rates of deforestation occurring during the recent decade of 2006 to 2014. Further, forest degradation (loss of tree canopy cover) also continues in Bangladesh. The FIP is aimed to address deforestation and forest degradation, to increase carbon stocks, conserve biodiversity and improve livelihoods.

Table 1.4: Annual trends of forest change in Bangladesh (Reddy et al., 2016) over different periods

Time period	Net rate of deforestation (%)	Gross rate of deforestation (%)	Rate of afforestation (%)
1930-1975	0.74	0.74	0.00
1975-1985	0.47	0.48	0.17
1985-1995	0.26	0.37	0.10
1995-2006	0.53	0.56	0.03
2006-2014	0.75	0.77	0.02

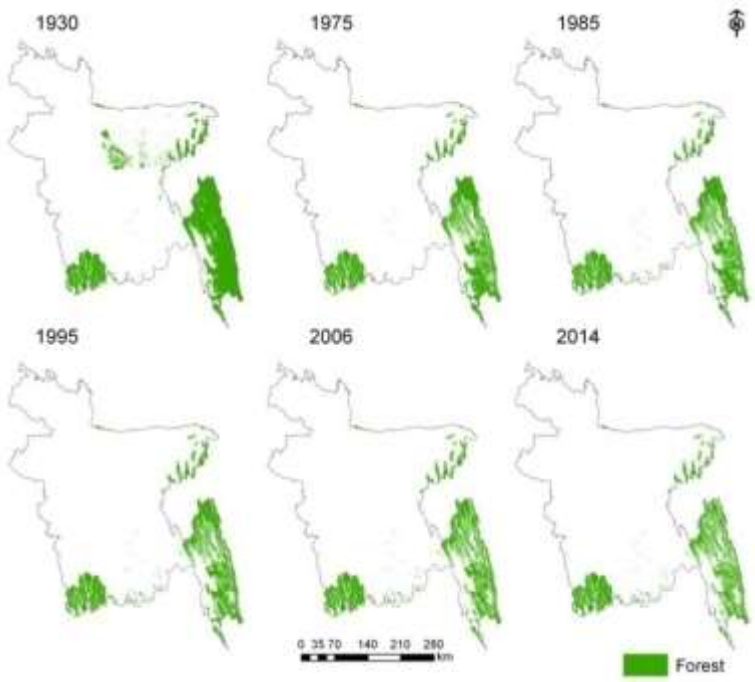


Figure 1.7: Trends in forest cover of Bangladesh over different periods during 1930 to 2014 (Reddy et al, 2016)

1.6 Role of Agroforestry, Homestead Gardens and Private Plantations

Agroforestry: Agroforestry is not a new forestry practice. It is being promoted by the forest department in Bangladesh from the past several decades. Bangladesh Forest Department has been practicing it in the name of Taungya in the hill forest for nearly 100 years. Agroforestry - as the name indicates is the practice of growing agriculture and forestry on the same land at the same time to optimize land utilization.

Homestead Gardens: Homestead garden is a traditional agroforestry system and an important component in the livelihoods of rural poor, and in the rural economy of Bangladesh. During the last 40–50 years, the relative importance has shifted from the traditional forestry to homestead forestry; since, homestead garden plays a vital role in providing firewood, fodder, medicine, fruit, and timber. It is estimated that about 70% of timber, 90% of firewood, 48% of sawn and veneer logs, and almost 90% of bamboo requirements are met from homestead forests. As the natural forest area is very low and decreasing due to anthropogenic pressure and land use change, homestead gardening is one of the most effective options for forest and biodiversity conservation in Bangladesh. Homestead forests are essentially tree gardens around rural habitations. These homesteads are estimated to meet nearly 80% (Draft FMP 2016) of the local demand for wood and other products. The NFA 2005–07 (Altrell et al., 2007) estimated their extent to be far more than all other natural and planted forests put together (2,767,000 ha, all plots over 0.1 ha in size). There are indications that area under homestead gardens has been growing ever since records are available. This underlines the importance of these resources for the local economy and conservation of natural forests and biodiversity.

Rural communities traditionally promote multipurpose tree species that provide fruits, vegetables and spices and which can also be used as timber. Species choice is critical to homestead gardens for conservation purposes in Bangladesh. Homestead gardens plays a significant role in forest conservation since all the wood and other NTFPs that are harvested

in the homestead gardens do not need to be collected from forests. Homestead gardens attract a number of bird species to collect their food and making nests and some animal species like squirrel take shelter and collect fruits from the urban and rural homestead gardens. Thus, homestead garden can contribute to biodiversity conservation.

It is also seen that some birds play a significant role as pollinators in controlling insect pests and for dispersal of seeds. Thus, birds can contribute to the natural regeneration of homestead plants species, since natural regeneration is the most important factor for tree diversity conservation. Studies also found a number of bamboo, shrub, herb, and climber species which are largely used by the households; also, provide shelter to animal diversity.

Private Plantations: Bangladesh Bureau of Statistics (BBS) carried out a "Household Based Forestry Survey 2011–12" in 2014 and recorded that 91.9% of households in Bangladesh owned trees. Apart from the formally recorded or recognized categories of forests, people of the Chittagong Hill Tracts (CHT) own significant chunks of private plantations. There is no accurate survey of the extent of these forests, although the estimated area of private forests in North Rangamati division alone is approximately 2,73,791 ha, which is mostly composed of teak and gamar plantations. The newfound interest of the indigenous people of CHT in horticulture suggests that the teak and gamar plantations may be declining.

Apart from the above, rubber plantations and agarwood plantations also contribute to the TOF sector. Bangladesh has approximately 32,000 ha of rubber plantations owned by BFIDC, private growers and Chittagong Hills Development Board**.** Agarwood plantations have become popular recently due to financial gains. BFD has done experimental agarwood plantations in the hill districts over an area of approximately 5,800 ha. Thus, it is possible to conclude that promotion of agroforestry, homestead gardens and private plantations will have a critical role in the FIP and in meeting the goals of the forest sector in Bangladesh.

1.7 Role of Coastal Mangroves

Bangladesh has the world's largest delta bounded by the Bay of Bengal to its south and supports a diverse and abundant mangrove habitat. The mangrove forests of the Sundarbans provide an important defense in limiting climate change impacts, providing protection to coastal areas from hurricanes and cyclones. Mangroves serve as a biological shield protecting coastal communities from the worst effects of storm surge. Loss of mangroves exacerbates the disaster risk for local populations from storm surge and flooding.

Mangroves are also the most carbon rich forests in the tropics with a high carbon sink per hectare. Thus, degradation and loss of mangroves will substantially reduce the ability to mitigate and adapt to the climate change. Their degradation also releases large amounts of 'blue carbon' stored in sediments to the atmosphere, a process that has been under estimated. Over the last 30 years some 7,500 hectares in Bangladesh have been submerged by rising sea.

The annual economic value of mangroves is estimated to be US$ 200,000-$900,000 per ha (Wells, 2006) (World, n.d.). Mangrove forests offer good opportunities for ecotourism and economic benefits to local coastal communities of Bangladesh. The mangrove forests have been shown to sustain more than 70 direct human activities, ranging from fuelwood collection to fisheries (Dixon, 1989; Lucy, 2006).

Sundarbans: The Sundarbans located in Bangladesh is one of the largest continuous mangrove forests in the world (Figure 1.8). It is also known for its immense biodiversity

nature. It is home to many terrestrial aquatic and marine habitats; ranging from micro to macro flora and fauna. The Sundarbans is of universal importance for globally endangered species including the Royal Bengal Tiger, Ganges and Irawadi dolphins, estuarine crocodiles and the critically endangered endemic river terrapin (Batagurbaska).

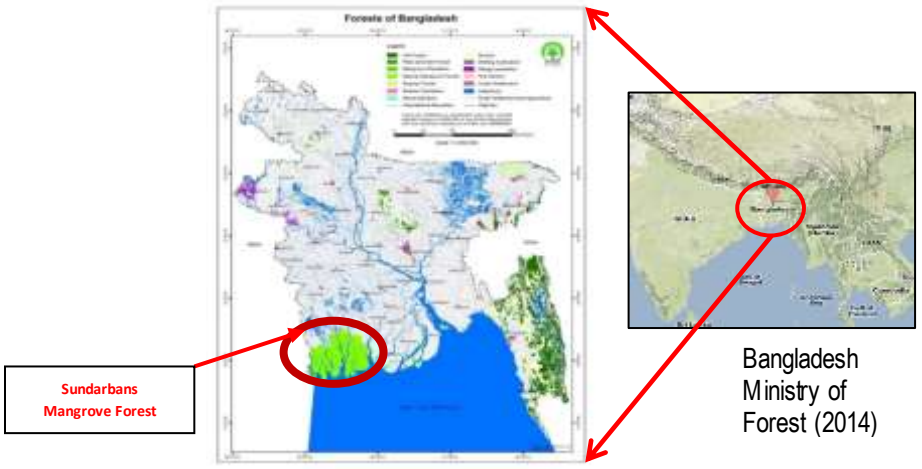


Figure 1.8: Sundarban Mangrove Forest in Bangladesh (Source: MoEF, 2014)

Sundarbans is treated as a global carbon sink of~205 Mt CO_2 per year (FD 2011). Bangladesh is situated in tropical cyclone prone area and 12 catastrophic cyclones have hit the Sundarbans since 1900. Climate change along with other natural and anthropogenic factors have significant negative impact on this unique mangrove ecosystem (Uddin et al. 2013). Most of the ecosystems will be severely affected due to the raising sea level. If expected sea level raises 1 meter above the current level, then the entire Sundarbans may disappear (FRA, 2000) , leading to potential loss of economic value of the key provisioning services (timber, food, fisheries, NTFPs)including other ecosystem services; e.g. tourism, biodiversity, carbon sequestration, protection from cyclones).

1.8 **Afforestation, Reforestation and Coastal Mangrove Afforestation**

The first attempt at raising a forest plantation in Bangladesh part was made in 1871 with teak, in the Chittagong Hill Tracts using seeds brought from Burma. The policy of converting mixed forests of high species diversity to plantations continued even after independence until 1979, when the country's first forest policy was adopted and commercial exploitation of natural forests was progressively restricted in order to conserve bio-diverse forests. Since then, plantations of fast growing species under the social forestry programme and coastal plantations for protection of coastal communities have been undertaken. Apart from the creation of social forestry woodlots of short rotation species in denuded or encroached forests, BFD has also been establishing large-scale strip plantations outside forest areas.

According to the 7th Five Year Plan, existing scattered and denuded hill forests are proposed to be replanted to increase productivity by adopting scientific management practices. In order to prevent the extent of damage by cyclones and tidal surges, the plan envisages creating a Coastal Green Belt. Different estimates of area brought under plantations are available. As per the FIGNSP 2013 study, the actual area under various kinds of plantations is estimated as given in the Table 1.5.

Table 1.5: Area under plantations (ha) according to FIGNSP, 2013 study

Plantations (Long Term and Short Term)	75,872
Scattered Forest in CHT Mixed with Teak Plantations	116,971
Plantations in USF (FD controlled)	17,347
Coastal Plantations	61,574
Rubber Plantations	9,217
Strip Plantations	62,329
Total	**334,093**

As per NBSAP (2016) an area of 474,312 ha has been planted by the government upto 2015. According to the information provided by BFD, an area of 71,022 ha has been planted under the social forestry programme, along with nearly 62,329 km of strip plantations between 1981 and 2015, although FAO 2016 (FAO, 2016) indicates their extent to be 73,000 km before 2005, equivalent to about 73,000 ha. As strip plantation activity has also been promoted by many NGOs in the past, as a part of their social forestry programmes, the actual extent of strip plantations may actually be much more than what the BFD records show. As social forestry plantations are also exploited, and regenerated, at the end of the rotation period, the actual area under plantations may be much less.

The extent of coastal plantations carried out so far is estimated to be nearly 200,009 ha. Most of the coastal plantations have been developed primarily with the objective of stabilising the newly acquired lands. This land is given to the forest department for a period of 20 years to establish plantations and it is returned to the revenue department at the end of this period. An area of 45,351 ha has been returned to the civil authorities in this process, in various coastal afforestation divisions. Due to degradation and diversion of coastal plantations, the actual area under coastal plantations is estimated to be only 61,574 ha against a planted area of more than 200,000 ha.

Under the Climate Resilient Participatory Afforestation and Reforestation Project (CRPARP), managed by the World Bank, Forest Department raised about 17,000 ha in 10 divisions of Bangladesh during 2013–2016.Compared to other forest types, mangrove forests are carbon dense forests, where Bangladesh can contribute significantly towards global carbon sequestration by afforestation and increasing forest cover in new lands and reducing deforestation.

In Bangladesh, some of the afforestation programmes implemented are as follows:

- Upazila Afforestation and Nursery Development Project (1987-95)
- Extended Social Forestry Project (1995-97) to raise agroforestry and woodlot plantation in degraded and encroached Sal Forest land.
    - The other components of the projects were: strip plantation; institutional planting and seedling distribution; training of local community leaders, NGO workers, teachers and students; establishment of Upazila Nursery and Forestry Extension Training Centre; and support to private nurseries.
- Forest Resources Management Project (1992-2000) was implemented to develop forest and human resources for forestry development in the country.
- Coastal Green Belt Project (1995-2000) was implemented to create a live shelterbelt of trees along the coastlines of the country. The principal components included

embankment plantation; foreshore and barrow pit plantation; homestead and institutional plantation; establishment of nurseries and training centres.

- CRPARP Project raised about 17,000 ha in 10 divisions of Bangladesh during 2013–2016.

1.9 CO_2 emissions from LULUCF (Land Use, Land-Use Change and Forest) Sector

Bangladesh has estimated and submitted CO_2 emissions inventory under two National Communications to the United Nations Framework Convention on Climate Change (UNFCCC). CO_2 emissions from Land Use, Land-Use Change and Forest Sector (LULUCF) are estimated for four sub-sectors which are the sources and sinks of carbon dioxide namely:

i. Change in forest and other woody biomass stocks
ii. Forest and grassland conversion
iii. Abandonment of managed lands
iv. Change in soil carbon

Total Carbon Dioxide Emissions from LULUCF sector

Table 1.6 shows the summary of estimates of net CO_2 emissions for the years 2000-2001 and 2004-2005. LULUCF is a net source of CO_2 emissions during 2000 and 2004. It is seen that there is a decreasing trend in CO_2 emissions in the LULUCF sector. As noted above, this may be attributed to the increase in social forestry as estimated for "Forest and other woody biomass" for 2004-2005.

Table 1.6: Carbon dioxide emissions (Gg of CO_2) from LULUCF sector (Source: NATCOM, 2014)

Year	Forest and other woody biomass	Forest and grassland conversion	Abandonment of managed lands	Soil carbon	Total carbon emission
2000-2001	5884.67	4951.91	+0.01	17582	28418.97
2004-2005	-4328.78	4951.91	+0.01	17582	18205.52

Note: "-" denotes uptake and "+" denotes emission

1.10 Carbon Stocks in Forests and Trends

The LULUCF activities contribute to 20% of GHG emissions of Bangladesh. However, its contribution to global GHG emissions is low (<0.2%) (WRI 2014) (Reach & Engagement, 2014), Per capita CO_2 emissions are also one of the lowest in the world and were estimated at 0.37 metric tonnes of CO_2 in 2011.There is no complete inventory for forest carbon estimation in Bangladesh. The latest assessment by the Food and Agriculture Organization of the United Nations (FAO) (i.e. Global Forest Resources Assessment 2010) (Sivaram, Sandeep, & Matieu, 2016) reports 81 million tonnes carbon in living forest biomass in the country (FAO 2010). By contrast, Alamgir and Turton (2014) reported carbon density between 49-121 tonnes per hectare in the country's forests depending on the condition of the vegetation (e.g. open canopy versus closed canopy). A large variability exists also in the national-level estimates of forests' carbon density, which is mainly attributable to differences in methods and sampling strategies (Table 1.7). Using carbon densities reported, the carbon stocks in Forest Department-managed forests is estimated to be between 98 and 240 Mt. The estimated carbon storage in soil (up to 30cm depth) in the country's forests is about 92.9 Mt (FAO 2007). It is also observed that there is a wide range and high uncertainty of estimates of carbon stocks in forests of Bangladesh (Table 1.7).

Table 1.7: National level estimates of biomass carbon in Forest Department-managed forests in Bangladesh (Source:Mukul, et al., 2014)

Source	Carbon density* (t/ha)	Total Carbon stock (Million tonnes)	Remark
Saatchi et al. 2011	70.5	107.2	Based on satellite data
Gibbs and Brown 2007	158	240.2	Based on forest inventory
Gibbs et al. 2007	65	98.8	Based on harvest data
IPCC 2006	93	141.4	Based on harvest data
DeFries et al. 2002	137	208.2	Based on harvest data
Brown 1997	92	139.8	Based on forest inventory
Mean	102.6	155.9	

*using median value when providing a range.

Total carbon stock densities: The average ecosystem carbon density in Bangladesh forests is estimated to be 175.5 tonnes per ha (Table 1.8). Despite its degraded nature, highest carbon density is seen in the Sal forests (202.2 tonnes per ha), which may be due to a limited number of studies (n=1) on biomass carbon and bias in sampling. This could be the same case for soil carbon in mangrove forests. Mangrove forests constitute the highest share (54%) of the country's biomass carbon stock, followed by hill (36%) and the Sal forests (Figure 1.9). Soil organic carbon stock is, however, highest in the hill forests (38.6tonnes), comprising nearly 53% of the country's total carbon stock in soil. Based on the studies, it is found that higher uncertainty in soil carbon density is in the hill forests (47.1%) followed by the Sal (29.9%) and mangrove forests (Figure 1.10).

Table 1.8: Total carbon density in major forest types in Bangladesh (Source: Mukul et al. 2014)

Forest type	Carbon density (tonnes/ha)		
	Biomass	Soil	Total
Hill forests	96.1 (± 17.86)	57.6 (± 27.13)	153.7
Mangrove forests with mangrove plantations	131.8 (± 17.21)	38.8 (± 7.28)	170.6
Sal forests	153.9 (0)	48.3 (± 14.42)	202.2
Mean	**127.3**	**48.2**	**175.5**

There are many estimates of biomass, soil and total carbon stocks for Bangladesh. There are large variations among different estimates. The uncertainty in the estimates is very high. Further, the carbon stock or density values for different forest types seem to be high. There are no reliable estimates of carbon stocks and rates of change in natural forests, plantations, agroforestry, homestead gardens or private forests. Thus, one of the requirements for FIP is to have a good "Monitoring, Reporting and Verification" (MRV) mechanism for estimation and monitoring of carbon stock changes periodically.

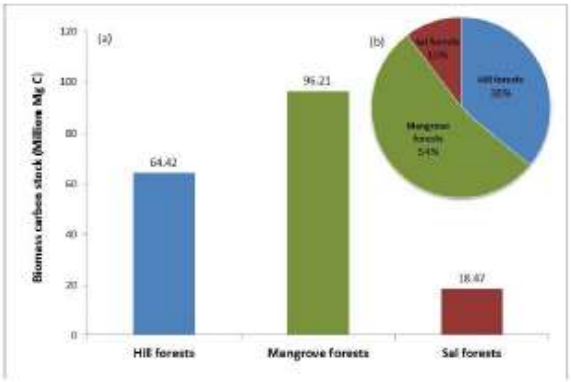


Figure 1.9: Carbon stock (MtC) in biomass in major forest types of Bangladesh (a), and their relative contribution (b) (Source: Mukul et al. 2014)

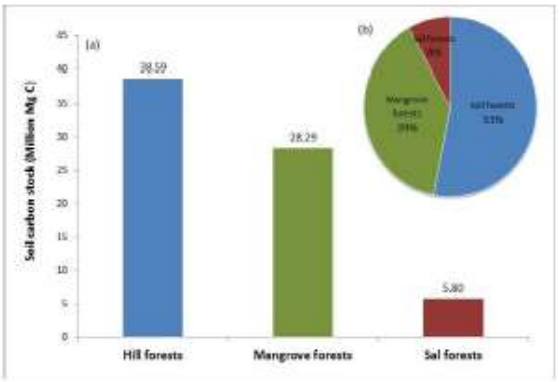


Figure 1.10: Soil organic carbon storage (MtC) in major forest types of Bangladesh (a), and their relative contribution (b) (Source: Mukul, et al. 2014)

1.11 Drivers of Deforestation

Bangladesh has diverse landscapes, supporting a variety of forest types with distinct vegetation composition. It was observed in Section 1.5 that Bangladesh is experiencing forest loss and forest degradation. However, estimates according to UNFCCC definition of deforestation are not clear. The causes of deforestation and forest degradation in different forest types are very complex and diverse. Primarily, they are linked to the clearing of forest land, or the use of forest resources, for human settlement, agriculture, timber, fuelwood and housing materials. Unsustainable and inappropriate forest management practices, as well as natural disturbances play a significant role in determining the changed composition and degradation of forests. Further, the intensity and frequency of cyclones in the coastal region have increased in recent years, which give the mangrove forests less time and less chance to recover. The changed pattern of cyclones and hurricanes is often attributed to the adverse impacts of climate change. Increased salinity due to sea level rise also contributes to the degradation of mangroves in Bangladesh. Thus, the causes of deforestation and degradation are both human and natural. There are several assessments of drivers and causes of deforestation and degradation. The assessment by the UNREDD project is based on multi-stakeholder consultations.

Even though only 17.4%, or 2.6 million ha (National Conservation Strategy, 2016) (Rahman, 2016) of geographic area is under forests, deforestation and forest degradation occurs in Bangladesh. Several assessments of causes or drivers of deforestation and degradation are available including the recent UNREDD study. It is difficult to say if the UNFCCC definition of "Deforestation" is used in the assessment of the causes. Further, the definition of "Forest Degradation" adopted is not clear. Bangladesh Forest Department (BFD) and other stakeholders understand the meaning of the terms Deforestation and Forest Degradation differently.

Quantitative estimates of major drivers of deforestation in Bangladesh: Remote sensing based quantitative estimates of the major drivers of deforestation are given in Table 1.9, based on a study by Reddy et al, 2016 (Reddy et al., 2016). In this study, deforestation is considered as replacement of native forest by other land use and/or reduction of forest canopy cover to less than 10 percent. Table 1.9 provides information on conversion of forest land to other purposes. It can be observed that during the 40-year period of 1975 to 2014, 25% of deforested area was converted to agriculture and about 58% was converted to scrub.

However, during the recent 8-years period (2006 to 2014), it can be observed that 34% of deforested land was converted to agriculture and 35% of land was converted to scrub land. This indicates that the two major drivers of deforestation are:

- Conversion of forest land to agriculture
- Conversion of forest land to scrub land, indicating unsustainable logging of trees.

Table 1.9: Recorded land use in deforested area (in 1000 ha) in Bangladesh during the period 1975 to 2014 (Reddy et al, 2016)

Forest to other land use	**1930-2014**		**1975-2014**		**1985-2014**		**1995-2014**		**2006-2014**	
	Area	**%**	**Area**	**%**	**Area**	**%**	**Area**	**%**	**Area**	**%**
Agriculture	2249	24.8	705	24.9	566	23.9	498	26.9	336	33.9
Scrub	3955	43.7	1634	57.7	1481	62.7	1151	62.2	528	53.3
Plantations	1531	16.9	272	9.6	142	6	107	5.8	73	7.4
Others	1325	14.3	224	7.8	176	7.4	95	5.1	54	5.4
Total	9060	100	2835	100	2365	100	1851	100	991	100

Drivers identified by different agencies and programmes: A number of reports, programmes and studies have identified the main causes or drivers of deforestation and forest degradation in Bangladesh. Some of the key drivers from different reports are presented in Table 1.10, and Table 1.11 presents drivers identified by UNREDD through stakeholder consultation workshops.

Table 1.10: Key drivers identified by different agencies/programmes

Agency/Programme/Report	***Key Drivers***
Country Investment Plan	5. Encroachment of forest land due to insufficient demarcation of boundaries and improper land records 6. Increase in demand for forest products 7. Salinity intrusion in natural forests 8. Weak enforcement of forest laws
National Conservation Strategy	6. Increase in pressure on forests and homesteads for forest products 7. Forest encroachment, illegal logging 8. Imbalance in forest products supply and demand 9. Land tenure issues 10. Weak institutional capacities, poor governance, weak law enforcement
Forestry Master Plan	7. Absence of forest boundaries, maps, land records 8. Limitation in forest department staff, lack of capacity, trained manpower 9. Over exploitation of forest products 10. Illegal tree felling 11. Encroachment of forest land for agriculture and other purposes 12. Poor financing or investment
Bangladesh Delta Plan	9. Conversion of forest land to agriculture 10. Urbanization/Industrialization 11. Demand for fuel and firewood 12. Illicit felling of trees 13. Encroachment of forest land 14. Lack of policies 15. Non-sustainable forest management 16. Exotic rubber plantations

Table 1.11: Key direct and indirect drivers identified by UNREDD through stakeholder consultation according to major forest types

Forest Types	***Direct Drivers***	***Indirect Drivers***
Hill Forests	• Illegal logging • Unsustainable logging practices • Shifting cultivation • Conversion of forest land to agriculture purposes, plantations • Forest clearances • Infrastructure development • Urbanization	• Inadequate forest management plans • Lack of trained manpower • Lack of boundary demarcation • Weak enforcement of laws • Inadequate finance to forest department • Land tenure issues
Sal Forests	• Homestead agroforestry and agriculture • Illegal logging • Overlapping /unclear jurisdictions; • Demand for land settlement and agriculture • Demand for industrial land • Infrastructure development • Lack of alternate livelihood opportunities	• Lack of demarcation of forests • Lack of capacity and weak policy implementation • Lack of adequate financing and poor manpower • Land tenure issues • Increase in population • Increasing accessibility of forest areas • Weak governance
Natural mangroves	• Illegal logging • Demand of forest land for agriculture and homestead development	• Low institutional capacity and weak policy implementation • Inadequate forest law enforcement • Lack of finance to support sustainable forest management activities by line agencies • Lack of political commitment for forest management • Population increase • Unclear forest land tenure • Sea level rise, Salinity increase • Cyclone and tidal surges
Coastal plantations	• Encroachment for agriculture and settlements • Conflicting government policy • Political support for land grabbers • Infrastructure development • Unnecessary delay in reservation of forest land	• Unclear management objectives • Weak institutional capacity • Lack of adequate finance • Weak enforcement of the law • Sea level rise, Salinity increase • Cyclone and tidal surges

A large number of drivers have been identified and a few key drivers are presented here.

- Absence of forest boundaries, maps, land records, land tenure and inadequate laws.
- Illegal encroachment of forest land for agriculture, plantations and other purposes.
- Illegal felling or logging of trees, over-exploitation and unsustainable harvesting.
- Conversion of forest land for infrastructure, settlements and urban expansion.
- Meeting the demands for fuelwood, timber and industrial wood.
- Weak forest department, lack of staff, inadequate capacity, inadequate infrastructure and facilities.

- Inadequate investment in forest sector for infrastructure, staffing, training, protection, afforestation and reforestation, monitoring and research.
- Natural causes such as cyclones, increase in salinity, sea level rise, etc.

1.12 Challenges for the Forest sector in Bangladesh

Forest Department under the Ministry of Environment and Forest is the main agency having a mandate for management, conservation and sustainable development of all types of forests in Bangladesh. Forest department has full responsibility for forest protection, conservation, afforestation/reforestation, protected area management, community engagement or participation, etc. One of the key drivers of deforestation and degradation identified in the previous section relates to inadequate investment. Some of the main challenges faced by the forest sector and the forest department as mentioned in 7th Five Year Plan are as follows:

Weak capacity: Government officials, especially at local institutions (Upazila, Union Parishads, Municipal corporations, etc.) do not have adequate management skills in order to respond to various impacts of climate change. GoB institutions are not adequate to improve performance of officials or to hold them accountable for delivery of results.

Understanding, Knowledge and Capacity: Even at the central Government level, understanding and knowledge is limited to few officials working in technical institutions. Most of the officials need immediate capacity enhancement trainings in order to equip themselves to act as per mandate of the BCCSAP and project designing under ADP.

Priorities are not set: So far, no effort has been made to elaborate financial requirements for each of the prioritized programmes/projects. Without proper prioritization, concerned authorities will find it difficult to identify projects that might be more useful towards CCA.

Weakness in implementation, monitoring and shared learning: CCA is a process that requires participation from all stakeholders. CCA sensitive projects should be designed through a proper participatory process, where the concerns of local people, especially women and the marginalized population, will be duly addressed. There should also be a project monitoring system which allows people's voice to be incorporated and evaluated.

Lack of Financing: The BCCSAP requires an outlay of $10 billion for the 10 year period. Lack of financing has been a crippling factor for the government in implementing BCCSAP, especially its priority projects and programmes. Furthermore, release of funding, especially by development partners and lack of fund management capacity is additional limitations.

Institutional Coordination: To ensure an effective multi-dimensional response system, proper coordination among relevant institutions is a must. A whole of government approach is best suited to achieve this objective. The Government acknowledges that the MoEF, serves as the focal point on climate change, has not been fully able to coordinate with other institutions. This was observed in the monitoring and evaluation of already financed projects under the BCCSAP. Lack of coordination is a huge blow to CCA as it prevents synergy and counteracts expected benefits from any given project.

Also, there are few other challenges that are identified from the other programmes and are listed below.
Main challenges of the forest sector are as follows:

8. Low area under forest
9. Low quality of forest; low crown cover, biomass density and biodiversity
10. Over-exploitation of the forest resources
11. Large scale illicit removal of timber and other forest resources
12. Pressure on forest land for many purposes leading to illegal encroachment and official conversion of forest land to commercial land
13. Increase in demand for fuelwood, timber and industrial wood
14. Low investment in forest sector

Institutional challenges for the forest sector and department are as follows:

6. Absence of demarcation of forest land and boundaries
7. Inadequate staff in the forest department and inadequate training and capacity
8. Inadequate infrastructure, legal support for enforcing forest laws and for undertaking conservation and afforestation
9. Lack of research capacity
10. Inadequate financing

In this FIP, an attempt will be made in the following chapters to identify a set of opportunities and a set of forest investment plans to address the challenges faced by the forest sector and to meet the national goals and international commitments for the forest sector.

1.13 Objectives of Forest Investment Programme

The main purpose of the Forest Investment Programme is to support developing countries' REDD-efforts, providing up-front bridge financing for readiness reforms, and to identify public and private investments through national REDD readiness strategy building efforts. Further, FIP also explores opportunities to help the countries to adapt to the impacts of climate change on forests and to contribute to multiple benefits such as biodiversity conservation, protection of the rights of indigenous peoples and local communities, poverty reduction and rural livelihood enhancements. The FIP aims to finance efforts to address the underlying causes of deforestation and forest degradation and to overcome barriers that have hindered past efforts to do so.

Objectives of FIP

The FIP is designed to support developing countries' REDD efforts and promote sustainable forest management through four main objectives:

1) Initiate and facilitate transformational change in developing countries' forest related policies and practices.

2) Facilitate the leveraging of additional and sustained financial resources for REDD, including through a possible UNFCCC forest mechanism, leading to an effective and sustained reduction of deforestation and forest degradation, and enhancing the sustainable management of forests;

3) Pilot replicable models to generate understanding and learning of the links between the implementation of forest-related investments, policies and measures and long-term emission reductions and conservation, sustainable management of forests and the enhancement of forest carbon stocks in developing countries.; and

4) Provide valuable experience and feedback in the context of the UNFCCC deliberations on REDD.

To achieve the objectives mentioned above, the FIP will support and promote, *inter alia*, investments in the following areas: i) institutional capacity, forest governance and information management, ii) investments in forest mitigation measures, including forest ecosystem services and iii) investments outside the forest sector necessary to reduce the pressure on forests.

The specific objectives of Bangladesh FIP are as follows:

1. *To promote* "Sustainable Forests and Livelihoods for Carbon Sequestration, Resilience to Climate Change and Biodiversity Conservation and improved livelihoods"
2. *To promote* "Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink"
3. "Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate carbon sink conservation and sequestration"
4. To facilitate leveraging of additional financing resources for REDD including through multilateral banks, bilateral agencies and UNFCCC financing mechanisms.

Chapter 2: Identification of Opportunities for Greenhouse Gas Abatement

2.1 Introduction

Bangladesh is one of the large developing countries with very limited natural forest cover. According to FAO (FRA 2000) (Nations, 2000), Bangladesh has one of the lowest per-capita area under forests. The Government of Bangladesh has realized that the area under forests and in particular, area under natural forests is extremely low in the country. Under such a situation, all the existing natural forests must be conserved and the forest cover needs to be increased upto 20% of the total area of the country. Bangladesh is one of the very progressive countries in realizing the climate change concern and in mainstreaming climate change in many of the developmental programmes. Bangladesh, driven by the fact of having very low forest coverage, has undertaken many initiatives to promote the forestry sector. Bangladesh, in its Draft National Forest Policy and Draft Forestry Master Plan 2017, has set clear goals for the forestry sector and to address "climate change". In addition, several initiatives are also being implemented with support from external agencies. In this chapter, all the major forest sector related initiatives in the context of 'climate change' are reviewed and synthesized to identify opportunities for GHG abatement. Bangladesh forest sector (LULUCF) is estimated to be a net source of 4.95 Mt CO_2 during 2010 (National Communications, 2012) (Department of Environment Ministry of Environment and Forests, 2012). Thus, the goal for forest sector GHG abatement includes not only reducing the CO_2 emissions, but also enhancing the 'Carbon Sinks', through removal of CO_2 from atmosphere and storing it in forest trees and soil. The following forest policies and programmes are reviewed to identify the common opportunities for GHG abatement across programmes, to ensure that the programmes and projects proposed under the FIP are compatible with the policies and programmes of the Government of Bangladesh.

1. Seventh (7^{th}) Five Year plan
2. National Forest Policy 2016 (proposed)
3. FMP (Forestry Master Plan) strategies and targets for forest sector
4. INDC - submitted to UNFCCC by Bangladesh
5. CIP - Country Investment Plan of Bangladesh
6. National Conservation Strategy (NCS)
7. Bangladesh Climate Change Strategy and Action Plan (BCCSAP)
8. UN-REDD Programme

2.2 Seventh (7^{th}) Five Year Plan: Goals and Programmes

Bangladesh is currently implementing the 7^{th} Five Year Plan (period 2016 to 2020). The 'Forestry Sector' has been described as a sub-sector under "Environment". The 7^{th} Five Year Plan has incorporated a clear set of goals, objectives and activities to be implemented during the plan period as shown in Table 2.1. The Forestry sub-sector strategy includes - continuing moratorium on tree felling in the natural forests, increasing tree density of the existing forests and older plantations through 'enrichment planting' and 'assisted natural regeneration', and intensification of plantation activities in the coastal zones. Social forestry development is proposed to continue to be an important strategy. However, the 7^{th}Five Year plan does not provide the targets or the extent of area to be covered under different programmes or activities. During the 7^{th} plan period, emphasis is being given to increasing tree density to ≥70%, by improving stand quality through improved management interventions. The large number of ambitious goals, programmes and activities included in the 7^{th} FYP are not

adequately backed by investment required.(General Economics Division (GED), Planning Commission, 2015)

Table 2.1: Programmes, objectives and activities of the 7th Five Year Plan for forestry sector

Programme	Objectives and Activities
Afforestation/reforestation/plantation	1. Green Growth strategy to harmonize economic growth for better environmental sustainability 2. Greater efforts (which should exceed 6thFYP period achievements) shall be made for afforestation and reforestation activities during the plan period. 3. Productivity of plantations will be increased, so that by 2021, 90% of those designated for forests (1.6% of land) comprises of regenerating native trees. Multi-purpose trees will receive special attention to increase the productivity of land under forest. 4. The 20,000 acres of the denuded Chokoria-Sundarbans Reserve Forest shall be restored with time bound action and monitoring plan 5. People's meaningful and informed participation will be incorporated in all forest development activities. 6. Integration of tree plantation and crop cultivation will be practiced.
Moratorium on felling	1. Moratorium on felling in the natural forests will continue. 2. Existing scattered and denuded hill forests will be replanted to increase productivity. 3. Scientific management principles will be strictly followed to restore productivity of these lands.
Protection of Sundarbans and coastal afforestation	1. Greater efforts shall be taken for sustainable conservation of Sundarbans and its resources during the plan period. 2. Measures will be taken to involve local community by allocating appropriate property rights in the management of the Sundarbans 3. Creation of alternative livelihood opportunities for the people, depending on the Sundarbans mangrove forest. 4. Special attention will be given to the Sundarbans Reserve Forest (SRF) for its biodiversity conservation. All sorts of protective measures will be taken to keep the Sundarbans' bio-physical characteristics intact. 5. The existing afforestation and enrichment plantation will continue in the coastal areas. The existing mature coastal plantations will remain as green belt. 6. To prevent the extent of damage by cyclones and tidal surges, coastal green belt will be created and seedling will be raised to distribute or sell in the coastal zone.
Restoration of Sal Forest	Immediate steps will be taken for restoration of the Sal Forest aiming specific targets. Considering its wildlife and dwelling place of the Garo tribal community, necessary programmes will be implemented.
Reed lands of Sylhet	- Existing programme on reed land planting to continue. - Extending the programme to new areas.
Eco-park/ botanical garden	- Development and establishment of five new initiatives such as eco-parks, recreational garden along river or bay and botanical gardens, safari park, national park will be continued under this 7thFive Year Plan.

Programme	Objectives and Activities
	- Regional botanical garden will also be setup for uniform biodiversity conservation in the country.
Social forestry	- Social forestry Programme to continue for expansion and strengthening of *upazila* nurseries, union level nurseries, and strengthening of forest extension and nursery training centers. - Short/medium rotation fast growing tree species will be planted along the roads and embankments, and on marginal and fallow lands with active participation of local people. - The amended provision for social forestry on involvement of local people to be utilized to bring new areas under tree coverage.
Non-wood forest	More emphasis shall be given to non-wood forest products: bamboo, cane, *murta*, medicinal plants, honey, wax, *golpata*, during the 7thFive Year Plan.
Survey and land records	Efforts shall be taken to complete the forest land survey and updating the land record during the plan period. Forest cover shall also be monitored. Entire forest area will be demarcated to avoid unlawful encroachments.
Protected areas	Presently, only 2,700 sq. km land area falls under Protected Area category which is about 1.82% of the country. The Protected Area will be increased to 5 percent of the country during the 7thFive Year Plan period. Effective management for all the Protected Areas will be established.
Watershed management	Watershed management and wetland conservation will be initiated in the haor regions and hill districts and also will be intensified in the old areas for better conservation of nature during the plan period.
Private forests	Village forest has been meeting most of the demand for forest products like timber, firewood, etc. Credit facilities will be provided in the 7th FYP to encourage the private sector to undertake rubber, teak, jackfruit and other high value crop plantations on a commercial basis.
Carbon Credit and REDD Mechanism	The mechanisms for certifying and approving reforestation and forest protection under carbon credit and REDD mechanisms will be rationalized and streamlined and be used to enable substantial forest restoration and coastal afforestation through partnerships with local communities, civil society and private sector.

2.3 National Forest Policy 2016 (Proposed)

- Government of Bangladesh initiated a process to develop a new Forest Policy to address the emerging environmental and socioeconomic challenges in the context of climate change and extensive loss of forest cover in the country in the last two decades. The new Forestry Policy draft is currently being finalized by the GoB. Here some of the key policies relevant to climate change are listed:
- Maintain maximum area possible under tree cover and ensure through proper actions that deforestation is totally arrested.
- Strengthen resilience of forest ecosystems and forest dependent communities to climate change.

- Develop and implement programmes and projects aiming at mitigation and adaptation against adverse impacts of climate change.
- Strengthen the capacity of the Forest Department to support climate resilience and low carbon development through integrating climate change issues into planning and implementation of strategies.
- Create massive carbon sinks for carbon sequestration by bringing more areas under tree cover.
- Develop and implement awareness raising strategies and capacity development programmes on the opportunities for adaptation and mitigation measures as per the climate change action plan.
- Establish and strengthen research capacity for climate change and related environmental issues and their possible impacts on forest formations.
- Involve, build capacity and empower communities in mitigating and adapting to climate change.
- Undertake research for identifying suitable tree species for different plantation programmes, which are efficient in carbon sequestration.
- Given the higher efficiency of mangrove species in carbon fixing, undertake enhanced plantation programmes in coastal areas and offshore islands.
- Create a 'coastal green belt' of thick mangroves and other suitable climate resilient species to reduce vulnerability of coastal communities to the impact of climate change induced disasters.
- Commitments made at the Paris Climate Change Meeting and Intended Nationally Determined Commitments regarding LULUCF, shall guide the future forestry activities in the country.
- Enhancement of forestry carbon stocks and generation of benefits through mechanism such as Clean Development Mechanism, Reduced Emission from Deforestation and Forest Degradation Plus (REDD+) shall be among the main objectives of future forestry programmes.
- Formulate a climate financing mechanism that will help the country to take advantage of new and emerging climate change funds like REDD+, Forest-Carbon Partnership Facility, Green Climate Fund, and other available sources and also, include innovative ways to fund climate change actions domestically through accessing Bangladesh Climate Change Resilience Fund and support from other governmental allocations and other local sources.
- Develop a monitoring, reporting and verification system for the evaluation of emission reduction to ensure full access to REDD+ facility. Establish a national carbon trading platform and also, introduce payment for ecosystem services as a source of funds for climate resilience related activities.
- Generate knowledge regarding the impact of climate change on forest ecosystems, forestry resources and forest dependent communities through undertaking relevant studies and research.

Thus, the National Forest Policy covers all aspects of climate change, especially the need to enhance carbon stocks in forests and its monitoring. The broader details of National Forest Policy are covered under Chapter 3.

2.4 Forestry Master Plan (FMP)– 2016: Strategies and Targets

Bangladesh Government had a comprehensive Forestry Master Plan prepared in 1994. During the World Bank managed Climate Resilient Participatory Afforestation and Reforestation

Project (CRPARP), a programme was initiated to update the FMP. FMP was prepared based on secondary data and information, and stakeholder consultations. The FMP has identified the following as the major strategies.

1. Afforestation / reforestation on government lands,
2. Strengthening of Protected Area system and wildlife conservation,
3. People's participation in forestry and conservation,
4. Boosting of private tree planting activity, especially in areas that have been identified as TOF (Trees Outside Forest),
5. Control on encroachments,
6. Address the drivers of deforestation/degradation.

FMP considers 3 Scenarios for afforestation and reforestation as under:

- **Scenario 1:** Investments based on GoB's own fiscal resources and current level of institutional capacity
- **Scenario 2:** Investments based on current level of donor support and current level of institutional capacity i.e., with some additional availability of resources due to the unique (though unenviable) position of Bangladesh as the most climate vulnerable country in the world.
- **Scenario 3:** Investments without any resource or capacity constraints depending on estimated requirements. This scenario will incorporate the possibility of tapping non-traditional sources of funding, such as public private partnerships (PPP) or institutional finance.

Activities suggested under the FMP are given in Table 2.2. It can be observed from Table 2.2 that the dominant investment programmes include afforestation-reforestation, Protected Area and wildlife management and promotion of ToF (Trees Outside Forests).

Table 2.2: Proposed strategies, programmes and targets under Scenario 2 where additional funding will become available

Sr. No.	Programmes	Physical target		Financial allocation proposed (crores Taka)
		Units	Extent	
1	Preparation of forest management plans	No.	120	580
2	Conservation of Natural Forest: Sal	ha	18,000	60
3	Conservation of Natural Forest: Hill	ha	100,000	300
4	Conservation of Natural Forest: SRF	ha	400,000	500
5	New Plantations: All types	ha	229,588	4800
6	Promotion of TOF sector (Forestry Extension)	ha	2,000,000	500
7	Protected areas and wildlife management	ha	300,000	550
8	Management and protection of existing plantations	ha	100,000	110

REDD+ related activities under FMP

FMP recommends activities aimed at carbon sink conservation, carbon sink enhancement and supportive activities to promote implementation of REDD+. The dominant programmes recommended under them are presented in Table 2.3.

Table 2.3: REDD+ related activities and programmes recommended under FMP

REDD+ Activity	Programme
Carbon Sink Conservation	1. Conservation of remaining natural forests 2. Management of protected areas and protection of wildlife 3. Control of forest encroachments
Enhancing Carbon Stock	1. Reforestation/restoration of degraded state forest 2. Afforestation reforestation outside state forest including ToF 3. Coastal afforestation and creation of coastal green belt 4. Management and protection of existing plantations
Supportive strategies for carbon sink	1. Institutional reforms and capacity building for BFD 2. Strengthening community participation through co-management and Alternate Income Generation Activities (AIGA). 3. Promotion of PPP for reforestation 4. Strengthening, monitoring, evaluation and database facilities

2.5 Country Investment Plan (CIP-2016–2021)

Bangladesh recently prepared CIP covering various aspects of climate change. The total budget for CIP is about US$ 11.7 billion with a financing gap of US$ 7 billion. Out of this, the total allocation for forest and NRM is US$ 2.46 billion. According to the CIP, it is proposed to enhance tree cover by 2.84 Mha by 2021, which is a very ambitious target. The proposed programmes and the financing requirements relevant to forest sector are presented in Table 2.4. The major component of the CIP includes enhanced sustainable management of forests, biodiversity conservation and sustainable management of wetlands. It is not clear from this how much of the proposed allocation is for forest conservation, afforestation-reforestation and other supportive institution and capacity building activities. Further, activity-wise targets are not given for social forestry, afforestation/reforestation, agro-forestry, etc.(“Bangladesh Environment , Forestry and Climate Change Country Investment Plan Second Draft,” 2016)

The overall goal of the CIP is to increase the contribution of the Environment, Forestry and Climate Change (EFCC) sectors to the sustainable development of the country through enhanced provision of ecosystem services thereby helping to reduce poverty, improve environmental and human health and increase resilience to climate change. The CIP is designed to help the Government realize its policy objectives by guiding investment choices in their Annual Development Programmes (ADP).

Table 2.4: The objectives of CIP relevant to forest sector (Source: CIP2016)

Programmes	Sub-programmes (priority areas of intervention)
Sustainable management of and socio-economic benefits from forests enhanced	Social forestry, reforestation, afforestation, coastal green belt development, landscape restoration, and other agro-forestry practices
	Improve forest monitoring (to include both bio-physical and socio-economic aspects) - GIS & RS Based Forest Management)
	Small and medium forest enterprise and value chains development for socio-economic benefits, food security and employment creation (e.g. promotion of ecotourism and environmental services, financial services, certification, marketing of forest products and services)
	Improve security of land tenure, stakeholder awareness and capacity
Biodiversity conservation	Develop and enhance conservation of protected areas through joint government-community co-management
	Improve biodiversity monitoring (including strengthening monitoring capacities of institutions)
	Endangered species conservation and management (e.g. Implementation of Tiger Action Plan)
	Support implementation and scaling up of the Integrated Resources Management plan for the Sundarbans 2010 – 2020
Improved stakeholder participation and gender equity in EFCC	Development and Strengthening of mechanisms for stakeholder participation in EFCC policy development and implementation
Improved transparency, organizational processes and knowledge for evidence based decision-making	Support to implementation of EFCC Research Master Plan and Training Plan
	Establishment of a center for knowledge management and training on environment, forestry and climate change

Sub-programmes directly relevant to forest sectors: These programmes are listed in Table 2.5. However, the CIP does not give the extent or scale of the programmes or activities.

Table 2.5: Sub programmes under Country Investment Plan relevant to forest sector

Sub-programmes under CIP relevant to forest sector
Enhancement of the Forest Department's planting capacity (including supply of genetically improved nursery stock, maintenance and supervision)
Co-management of forests, participatory afforestation (social forestry, including plantation in marginalized lands), livelihood support (including homestead forestry) for forest dependent communities
Afforestation/reforestation in the hills and plain land forest areas
Coastal afforestation and creation and maintenance of coastal green belt (e.g. mangrove plantations)
Increase declaration of coastal afforested areas (by different stakeholders) as "reserve forest"
Improve social forestry guidelines by highlighting genetic improvement of seedling production, land and species suitability and maintenance operations
Improve forest monitoring (to include both bio-physical and socioeconomic aspects) - GIS & remote sensing-based forest management. - A national forestry inventory and satellite forest monitoring system that includes both bio-physical and socio-economic (including gender) aspects; - Capacity development to implement satellite based monitoring system, - Updating the land record and demarcated forest area; and - Improve linkages between monitoring data to national statistics, rural development and

enforcement initiatives.
Small and medium forest enterprise and value chains development for socio-economic benefits, food security and employment creation
Improve security of land tenure, stakeholder awareness and capacity - Updating and archiving (digitally and in hardcopies) all the land records of the Forest Department, - Analysis of tenure issues (highlighting stakeholder involvement /engagement, land use change, impacts on resources like lands and trees, encroachment and logging) and recommendation for time bound action plans, - Demarcation of forest areas to prevent encroachments, - Awareness raising programmes and capacity strengthening for people and other institutional stakeholders.
Develop and enhance conservation of Protected Areas through joint government-community co-management
Implement the Integrated Resources Management Plans for the Sundarbans 2010-2020
Increased Resilience at Community Level - Develop community adaptation through community based adaptation (CBA) and ecosystem based adaptation (EBA) - Scaling-up local innovations on adaptation

Investment Cost of Programmes Proposed under CIP

The costing of the CIP was a key component in the CIP preparation process and should be considered as a "strategic-level" costing to differentiate it from project-level costing that takes place during the preparation of projects and programmes (FAO, 2016). It is important to mention that the CIP includes only public investments i.e., investment channeled through the GoB as well as most of the investments from Development Partners (DP). Also, investments made through private sector channels in the EFCC sectors have not been taken into consideration as no reliable information is readily or systematically available. It was also decided not to include recurrent cost (e.g. government staff salaries) price support, subsidies and other interventions covered by the revenue budget. While costing should be accurate, it should be noted that the CIP provides estimated costs towards a realistic order of magnitude. Costing will then need to be further detailed and actualized when formulating projects and programmes (FAO, 2016).

The total cost of implementing the CIP for the Sustainable Development and Management of Natural Resources component: The total investment cost (Table 2.6) for preliminary activities is about $1.15 billion, out of this, funding is available from existing sources (to the tune of US$194 million). The total gap is estimated to be $962 million. Thus, there is a large gap in funding CIP activities relevant to forest sector.

Table 2.6: Financing of CIP and funding gap

Bangladesh EFCC Country Investment Plan (CIP 2016 – 2021)	CIP proposed	Existing resource	Funding gap	Percentage gap (%)
Sustainable Development and Management of Natural Resources				
Sustainable management of and socio-economic benefits from forests enhanced	$422,600,000	$35,000,000	$387,600,000	92%
Biodiversity conservation	$487,000,000	$36,000,000	$451,000,000	93%
Improved stakeholder participation and gender equity in EFCC	$148,000,000	$62,000,000	$86,000,000	58%
Improved transparency, organizational processes and knowledge for evidence based decision-making*	$99,000,000	$61,000,000	$38,000,000	38%

2.6 National Conservation Strategy (NCS)

Bangladesh has prepared National Conservation Strategy report including many objectives related to forest sector, climate change, and Sustainable Development Goals (SDG). The National Conservation Strategy (Rahman, 2016) presents a long list of strategies and action plans aimed at conservation and sustainable management of forests. Some of the key strategies from the NCS are listed below:

- Increase forest covered area through massive afforestation of designated forests, fallow lands, feeder roads, highways, railways and embankment, and newly accreted char land.
- Achieve biodiversity protection and conservation through strict enforcement of laws and community based participatory forest management.
- Engage specialized NGOs for awareness building, training and stakeholder group formation.
- The widening gap between demand and supply of forest produce need be bridged through augmentation of supply and economy in use. Increase supply through social forestry programmes, reforestation of blank areas of forests including old plantations, and regeneration of exploited areas.
- The practice of large-scale plantation of exotics and only few indigenous species should be reviewed critically. Preference should be given to various indigenous species.
- All encroachments in hill forests are to be recovered by strict enforcement of existing laws. Shifting cultivation in reserved forests of the Hill Tracts to be stopped by vigilance and rehabilitation.
- 'Coastal greenbelt' as a programme is to be continued through afforestation of newly accreted char lands. Participatory co-management of coastal mangrove forests to be initiated.
- Under forestry programmes AIGAs should be provided to forest dependent people residing outside forests through cooperatives.
- Consider proposed reorganization of the Forest Department; build capacity and provide necessary logistics for the Forest Department.

National Conservation Strategy has identified critical issues and has made recommendations for actions to promote conservation and sustainable management of forests. Some of the key challenges and strategies are presented in Table 2.7.

Table 2.7: Key challenges and suggested actions under National Conservation Strategy

Issues/challenges	Strategies/actions	Implementation agencies
Degradation and depletion of natural forests. - Particularly in CHT, Chittagong, Cox's Bazar and Sylhet - Out of the total of 722,716 hectares only 79,161 hectares (FIGNSP 2013) is prevailing - Out of the estimated original of 125,767 hectares of Sal forests, hardly 15% is in existence at present.	Massive afforestation and reforestation programmes.	MoEF & BFD
- ***Degradation of tree stock:*** Bangladesh part of Sundarban, extended over an area of 6017 km^2. Though the area is intact the growing stock is declining.	Enrichment planting programmes.	MoEF & BFD
Transfer of Forest Land: - BFD data indicates that till 2015, over 70,000 hectares of forest land has been transferred to other agencies.	Such transfers of forest land need to be stopped.	MoEF
Encroachment of forest land: - According to the BFD records about 68,000 hectares of forest land has been encroached.	Such encroachment must be stopped. Manpower of the BFD has to be increased many fold.	MoEF & BFD
Poor management of PAs - 51 sites have been declared as PAs by BFD. -The shortage of manpower and resources are the basic reasons for such poor management situation of the PAs. - Biodiversity conservation. - Though BFD has declared 51 sites as PA, there is no proper biodiversity conservation programme in any of these, mostly because of paucity of fund and very poor manpower.	PA management and visitor control has to be imposed. Biodiversity conservation programmes need to be launched	BFD
Pure plantations - According to FIGNSP 2013, there are 226,339 hectares of forest plantations are under BFD. Most of these are pure plantations. Many are exotic. These plantations are poor in biodiversity to support wildlife.	Mixed plantations of indigenous species should be encouraged.	BFD, Donors, MOEF
Growing demand of wood - The current consumption of timber in the country is nearly 8.57 million M^3, of which about 1.57 million M^3 is imported. - At present, there is no forest extension service for the village communities.	The homestead areas will require adequate technical support especially form the BFD to take this load. BFD should setup forest extension offices at every *upazila*.	BFD, MoEF & Ministry of Finance.
Impact of Climate Change - Will result in large-scale forest die-back, loss of biodiversity and reduced ecological benefits (IPCC, 2014). Bangladesh will be one of the worst	Large scale climate resilient afforestation and reforestation.	BFD, MoEF & Ministry of Finance.

sufferers.		
Revision of Forest Policy, Acts and Rules - The Forest Policy was revised in 1994. That has caused a definite positive impact on social forestry. Revision of forest policy proposed in 2016 with emphasis on climate change.	Quick adaptation of the proposed Forest Policy 2016 and revision of the forest transit rules required.	BFD & MoEF.
Absence of Forest Land Records - The BFD has poorly maintained land records. - The RoR may not be available in the concerned BFD offices.	Land records keeping of BFD need to be geared up. The forest maps need to be digitized and properly conserved.	BFD, MoEF & Ministry of Finance.

2.7 INDC (Intended Nationally Determined Contributions)

Bangladesh is highly vulnerable to climate change even though its emissions account for less than 0.35% of global emissions. Without ambitious action to limit greenhouse gas emissions internationally, the future costs of adapting to climate change will be much higher than they are today. If the world fails to take ambitious action, the costs to Bangladesh of climate change could amount to an annual loss of 2% of GDP by 2050 and 9.4% of GDP by 2100. According to the INDC, Bangladesh, therefore wants to play its part in the global collective action to reduce future emissions as part of a robust and ambitious international agreement.(Government of Bangladesh, 2015)

Bangladesh is adopting a two-fold strategy against climate change. The main focus of Bangladesh's activities is on increasing resilience to the impacts of climate change. However, at the same time, Bangladesh is also working to achieve low carbon as well as more resilient development. With respect to Bangladesh's contribution to global efforts to counter climate change, the INDC sets out a number of mitigation actions. The INDC includes both unconditional and conditional GHG emissions reduction goals for the power, transport, and industry sectors, alongside further mitigation actions in other sectors (including forestry), which Bangladesh intends to carry out. The INDC of Bangladesh consists of the following elements:

Mitigation contribution:

- An unconditional contribution to reduce GHG emissions by 5% from Business As-Usual (BAU) levels by 2030 in the power, transport and industry sectors, based on existing resources. A conditional 15% reduction in GHG emissions from BAU levels by 2030 in the power, transport, and industry sectors, subject to appropriate international support in the form of finance, investment, technology development and transfer, and capacity building.
- A number of further mitigation actions including afforestation/reforestation subject to the provision of additional international resources.

Adaptation component:

- An outline of what Bangladesh has already done on adaptation and what the next steps are, including the long-term vision for adaptation in Bangladesh and synergies with mitigation measures are presented.

LULUCF or Forestry Sector under INDC: The forestry sector mitigation actions are included in INDC, but under conditional financing. The following 4 mitigation strategies are included for the forest sector.

1. Continuation of coastal mangrove plantation
2. Reforestation and afforestation in the reserved forests
3. Plantation in the island areas of Bangladesh
4. Continuation of Social and Homestead forestry

INDC doesn't provide any targets or area to be covered under the following four mitigation actions.

2.8 Bangladesh Climate Change Strategy and Action Plan (BCCSAP)

Bangladesh prepared Climate Change Action Plan during 2009 (MoEF, 2009). Under this BCCSAP, forest sector is included as one of the important mitigation actions. The BCCSAP has highlighted the following:

- Much of government owned reserve forest land is largely without trees.
- Well-designed and adequately-funded programmes, involving local communities, are needed to reforest these lands.
- A well designed, forest of mixed species will support ecosystem and biodiversity conservation and may be a good source of carbon-trading through the REDD. Social and homestead forestry has gathered momentum in recent years. It needs to be further encouraged as it supports the livelihoods of the poor and local communities.

Actions included in the BCCSAP relevant to forest sector are as follows:

1. Provide support to existing and new coastal afforestation programmes, taking into account the future rise in salinity levels due to sea level rise.
2. Develop an extensive wetland afforestation programme to protect settlements against wave erosion.
3. Study the scope for carbon credits under REDD and invest, if appropriate, in reforestation of degraded reserve forests.
4. Provide support to existing and new homestead and social forestry programmes and enhance carbon sequestration.
5. Research the suitability of various tree species for their carbon-locking properties for designing various forestry programmes keeping in mind other environmental and socio-economic functions of forestry.

2.9 UN-REDD Programme

About 15-20% of the CO_2 emissions globally come from deforestation and forest degradation largely from tropical forests (IPCC 2007). One of the mitigation initiatives under the UNFCCC is UN-REDD programme (Reducing Emissions from Deforestation and Forest Degradation). As a tropical country that could support an increased forest area, Bangladesh has potential for reforestation and forest restoration under REDD+ activities because of the availability of formerly forested lands, as well as other presently degraded forests that could be managed sustainably. As a result, there is a large potential under REDD+ for additionality of carbon in the country. Bangladesh is embarking on its REDD-readiness programme as a key initial step aimed at assessment of the drivers of deforestation and forest degradation.(Redd, Redd, & Redd, n.d.)

The Forest Department of the Ministry of Environment and Forests (MoEF) is the lead Implementing Partner for the UN-REDD National Programme, led by a National Project Director and supported by a Programme Management Unit. UNDP and the FAO are the two implementing partners at the country level. The duration of the project is from May 2015 to April 2018, with the objective to support the Government of Bangladesh in the implementation of its REDD+ Readiness Roadmap. In this context, there are three expected outcomes:

1. Improved stakeholder awareness.
2. A national REDD+ strategy is formulated.
3. A national forest reference emissions level is established.

The UN-REDD has identified some of the critical issues and potential options based on stakeholder consultation and review of various programmes and projects. The UN-REDD programme is yet to finalize the REDD+ strategy to address the direct and indirect drivers. Some of the potential and critical issues and options to address them are given in Table 2.8.

Table 2.8: Suggested recommendations to address the direct and indirect drivers of Deforestation and Forest degradation under the UN-REDD programme based on the stakeholder consultation

Main strategy	***Recommended actions***
Improve the implementation of existing laws and policies	• Resolve land tenure issues, at the very least in REDD project areas. • Establishing the boundary demarcation of forest lands should be given priority • Restrict the removals of forest products to sustainable levels with a system of passes or permits, Control sawmills and brickfields and remove those that are currently operating illegally.
Capacity development (both institutional and individual)	• Improve efforts toward sustainable forest management, • Develop an adaptation programme for forest resilience to climate change • Develop and implement a forest monitoring, reporting and verification programme • Co-management becomes a cornerstone of the forest management programmes
Coordination (interdepartmental, IGO, NGO, etc.)	• Coordination between FD and other government agencies, forest dependent communities, local government representatives, NGOs, CSOs, is needed to improve co-management of forests • Co-management Committees (CMCs) should be given a formal legal basis
Improvements to forest policies and laws	• Forest offences should be non-bailable depending on the nature and magnitude of an offence • There is a need for strong regulation to stop transfer of privately owned Baid land inside the Sal forests to avoid further wood extraction • No Jote to be permitted within certain buffer area around reserve forests in CHT to avoid illegal harvest in the reserve areas • A tree planting movement should be encouraged and will require legal and policy support
Alternative livelihoods	• Supporting forest dependent communities with alternative livelihood strategies and programmes that match local traditions and cultures

Forest management	• Natural regeneration should be given priority in the hill and sal forests. Assisted natural regeneration and enrichment planting may be considered where applicable. • Land planning through zoning for conservation, protection and production purposes (core/buffer/ecotourism) • Promote indigenous multilayer tree planting around homesteads with raintree, fruit trees (coconut, malta, etc.), bamboos, etc. • Redefine *khas* land to exclude Acquired Forests, Protected Forests, newly accreted and forested coastal land and common property resources like *haor*, *baor*, *bee*l, rivers and other wetlands to avoid lease for the sake of conservation of these fragile ecosystems • Restore and sustainably manage degraded and other marginal areas, including coastal areas and wetlands, under climate resilient, participatory afforestation, reforestation, rehabilitation and ecological restoration processes to increase carbon sequestration consistent with the production and distribution of co-benefits that contribute to meeting local community requirements.
Commitment to conserve forests	• Improve and expand the Protected Areas network with a view towards protecting primary forests and the CBD Aichi global target of 17% of the land area • Provide incentives to conserve forests and consider imposing progressive taxes on forest resource extraction • Resolve land tenure issues
Research and Development	• Improve coordination with universities and research organizations to conduct research on issues related to forest, environment, livelihoods, and climate change mitigation and adaptation. Strengthen the Forest Research Institute and link it closely to the FD so that research priorities are aligned with departmental needs.

2.10 Synthesis of the Proposed Programmes and Initiatives for the Forest Sector of Bangladesh

Bangladesh Government and Forest Department have undertaken many initiatives aimed at developing the forest sector, supported by national and international programmes. Even internationally funded programmes are also approved by the Ministry of Environment and Forests.

In Sections 2.2 to 2.9, various plans and programmes considered under the eight major initiatives were presented. In this section, an attempt is made to synthesis these different interventions to identify the common initiatives or programmes that could be considered for FIP. Forest Policy is not included since it only presents broader policies and not programmes. Unfortunately, most of the initiatives except the Forestry Master Plan do not provide quantitative targets or estimates. Most of these initiatives generally provide what programmes, plans and activities to be implemented to promote development of forest sector. Some initiatives such as Forestry Master Plan, National Conservation Strategy, BCCSAP and UN-REDD highlight the potential challenges and concerns and strategies to address them. Synthesis of the interventions proposed under different programmes of GoB is presented in Table 2.9.

Table 2.9: Synthesis of the proposed major programmes under the seven major initiatives for the forest sector of Bangladesh

7th Five Year Plan	FMP	CIP	NCS	INDC	BCCSAP	UN-REDD
Afforestation /reforestation / plantation	Preparation of forest management plans	Social forestry, improving forest monitoring, improving security of land tenure for Sustainable management of and socio-economic benefits and forest enhancement	Massive afforestation and reforestation programmes required to address - Degradation & depletion of natural forests	Continuation of coastal mangrove plantation	Provide support to existing and new coastal afforestation programmes taking into account the future rise in salinity levels due to sea level rise.	Resolving land tenure issues, establishing boundary demarcation by Improving the implementation of existing laws and policies.
Replanting of scattered and denuded hill forests to overcome Moratorium on felling	Conservation of Natural Forest: Sal and hill forests (CHT)	Improvement of biodiversity monitoring, conserving endangered species and conserving protected areas by biodiversity conservation	Enrichment planting programmes required to address - Declining growing stock	Reforestation and afforestation in the reserved forests	Develop an extensive wetland afforestation programme to protect settlements against wave erosion	Sustainable forest management, developing adaptation programmes by capacity development (both institutional and individual)
Protection of Sundarbans and coastal afforestation		Developing EFCC policy and its implementation by Improved stakeholder participation and Gender Equity	Transfers of forest land to be stopped to address - the problem of transfer of forest land	Plantation in the island areas of Bangladesh	Study the scope for carbon credits under REDD and invest, if appropriate, in reforestation of degraded reserve forests	Maintaining proper coordination between forest department and other government agencies (interdepartmental, IGO, NGO, etc.)
Restoration of Sal Forest	Conservation of Natural Forest, Sundarban Reserve Forest	Establishing training on forestry and climate change by improving transparency, organizational processes and knowledge for evidence for decision making	Encroachment must be stopped. Manpower of the BFD has to be increased many fold.	Continuation of Social and Homestead forestry	Provide support to existing and new homestead and social forestry programmes and enhance carbon sequestration	Forest offence should be stopped, avoid wood extraction in natural forests, avoid illegal harvest in reserved areas by proper implementation and improvement to forest policies and laws
Expansion of planting in Reed lands of Sylhet	New Plantations: All types		PA management and visitor control has to be imposed by launching biodiversity conservation programmes		Research the suitability of various tree species for their carbon-locking properties for designing various	Supporting forest dependent communities through Alternative livelihood programmes

7th Five Year Plan	FMP	CIP	NCS	INDC	BCCSAP	UN-REDD
					forestry programmes keeping in mind other environmental and socio-economic functions of forestry.	
Promotion of uniform biodiversity conservation by Eco-park/ botanical garden development.	Promotion of TOF sector through Forestry Extension		Mixed plantations of indigenous species should be encouraged – in place of pure plantations.			Regeneration of natural forests, proper land planning, promoting homesteads, sustainable management degraded areas by efficient forest management
Strengthening of forest development, nursery training centers, planting and rotating fast growing trees under Social forestry enhancement	Protected areas and wildlife management by conserving natural forests		BFD should setup forest extension offices at every upazila to assist homestead forestry and fulfil the need for demand for wood			Protecting primary forests, providing incentives for conserving forests and resolve land tenure issues as the main commitment to conserve forests
Promotion of Non-wood forest products	Management and Protection of existing plantations by A & R programmes		Large scale climate resilient A & R programmes need to be initiated to overcome the impacts of climate change			Strengthen BFRI by linking it with BFD and coordinate with universities and research organisations for improved R&D programmes to resolve issues related to forests, climate change, mitigation and adaptation.
Maintaining and updating land records and avoiding unlawful encroachment by survey of land records	Conserving natural forests, managing protected areas, protecting wildlife and controlling forest encroachment by		Adaptation of the proposed Forest Policy 2016 and revision of the forest transit rules, adopt new policies, acts and rules.			

7th Five Year Plan	FMP	CIP	NCS	INDC	BCCSAP	UN-REDD
	improving Carbon Sink					
Effective management to increase the areas which fall under Protected areas	Improving Afforestation and Reforestation, coastal afforestation and protection of existing plantations to Enhance Carbon Stocks		Maintenance of proper land records under BFD need to be geared up and the forest maps need to be digitized and properly conserved.			
Conservation of nature by Watershed management and wetland conservation	Strengthening community participation, improving capacity building of BFD, evaluating database facility as Supportive strategy for carbon sink					
Providing credit facilities to initiate Private forests						
Forest restoration and improving coastal afforestation by Carbon Credit and REDD Mechanism						

2.11 Common Programmes, Policies and Practices Across Eight Initiatives

Based on the assessment of the eight major initiatives carried out in Sections 2.2 to 2.9, a common set of broad programmes or initiatives are identified in Table 2.10. It can be observed that majority of the initiatives have been recommended or included in most of the eight initiatives. Thus, these strategies could form the basis for FIP.

Table 2.10: Common set of proposed activities for FIP based on review of Eight National and International Forest Sector plans and initiatives

Activities	7th FYP	FMP	CIP	NCS	INDC	BCCSAP	UN-REDD
Climate resilient Afforestation/reforestation, and Social forestry + Mixed species	√	√	√	√ (Climate Resilience)	√	√	√ (Climate Resilience)
Moratorium on tree felling + Ban encroachment + Ban conservation of forest land + Conservation of natural forest	√	√	√	√	------	√	√
Secure forest land tenure, boundary marking, forest land survey, updating land record, demarcation, zoning (conservation, protection, production)	√	√	√	√	------	------	√
Sundarbans Alternative livelihoods + community involvement + Coastal afforestation	√	√	√	√	√	√	------
Conservation of Sal and Hill forests, natural forests	------	√	------	------	√	------	------
Enhancement of Protected Areas (from 1.82% to 5%) + Co-management + Biodiversity conservation	√	√	√	√	------	------	√
Meeting demand for timber, fuelwood and industry needs: Private forestry + PPP + ToF promotion +Value chain + Credit for farmers and private sector	√	√	√	------	√	------	√
Reforms in BFD and policies + BFD capacity building + monitoring + implementation of laws + policies	------	√	------	√	------	------	√
Strengthening community participation + co-management AIG activities	√	√	------	------	------	------	√
Monitoring and research on forest area, carbon stock, biodiversity and ecosystem services	------	√	------	------	------	√	√
Mechanism for promoting REDD+ and Carbon credit	√	√	------	------	------	√	------

2.12 Potential Investment Options for the FIP

In Section 2.11, a set of common forest sector programmes were presented based on consideration of the eight major plans and programmes namely: 7th Five Year Plan, Forestry Master Plan, Draft National Forest Policy, Country Investment Plan, National Conservation Strategy, INDC, BCCSAP and UN-REDD. Based on these seven initiatives and consultations held with different stakeholders during early January 2017, a set of three potential investment projects have been developed and presented in Table 2.11. These three programmes are generally consistent with the national goals and all the other initiatives considered in Table 2.9 and 2.10. The three major projects proposed are as follows (Table 2.11):

1. Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests
2. Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink
3. Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plain land Sal forest

The details of the rationale for the project, components, scale of the project, locations for implementation, and justification for investment are presented in Chapter 6 and the Annexures.

Table 2.11: Potential investment opportunities in forest sector

	Project	Components
1	Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests	*1.1 Restoration/ reforestation of degraded and deforested hill forestlands*
		1.2 Community identification, engagement, capacity building etc. for hill forests
		1.3 Management, monitoring logistics and maintenance
2	Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink	*2.1 Private land restoration for enhanced carbon sequestration*
		2.2 FENTC & SFPC renovation/temporary nursery establishment
		2.3 Capacity building of BFD frontier staffs and farmers
		2.4 *Management and monitoring including logistics*
3	Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plain land Sal forest	*3.1 Forestland survey and settlement of updated record*
		3.2 Capacity building for survey, forestland record management and strengthening forestland litigation
		3.3 Project management, monitoring, logistics and maintenance

Stakeholders consultation was held to obtain the views of multiple stakeholders on potential project options for inclusion in the FIP. Further, the draft FIP was put on the website for public comments and suggestions. Finally, it was sent to an expert for formal review.

A World Bank supported project titled "Bangladesh; Sustainable Forests and Livelihoods" (SUFAL) with a budget of US$ 175 million is also under preparation.

Sundarbans though is the most important part of the forest landscape of Bangladesh, it is not included in the FIP due to the following reason. There is highest political commitment for the protection and conservation of the Sundarbans mangrove forests in Bangladesh. BFD has been implementing a large number of projects for protection and conservation of Sundarbans including the Tiger and ecosystems. BFD is at an advanced stage of preparing a project "Protection of Sundarbans Mangrove Forests" at an estimated cost of US$ 95.00 million for enhancing management efficiency for the protection of Sundarbans mangrove forests, thereby improving biodiversity within this landscape. This project is proposed to improve protection, restoration, sustenance and conservation of biodiversity, create sustainable livelihood opportunities for the local communities, adopt scientific management and monitoring and promote ecotourism and recreation facilities in the Sundarbans.

Table 2.12 provides details of the 3 main projects proposed under FIP. This includes the three project titles, the components, area proposed to be covered and the main regions or zones or districts where the project is proposed, along with preliminary estimates of the investment required.

Table 2.12 Main project, components and Activities, targeted area for each activity and phasing of the activity

Project	Components	Activities	Total Area (FIP Area)/Total Unit (FIP Unit)	Phasing (How many years)	Total Zones Covering Districts/F Divisions [FIP Zones Covering Districts/F Divisions]	Total Budget (In Million US$) (FIP Budget)
1	2	3	4	5	6	7
1. Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests	1.1 Restoration/ reforestation of degraded and deforested hill forestlands	a. Land identification, restoration / reforestation plan preparation, species selection etc.[52600 (16075) ha.] b. Plantation / enrichment plantation with ANR in degraded and deforested hill forests with current year's seedlings including nursery raising/seedling purchase, land preparation, planting, vacancy filling and 3 year's maintenance [37600(9750) ha.] c. Plantation / enrichment plantation with ANR in degraded and deforested hill forests including nursery raising/ seedling purchase of current year, land preparation, planting, vacancy filling and 3 year's maintenance [12500(4000) ha.] d. Mixed plantation in the hill forests including nursery raising/cutting purchase, land preparation, planting and maintenance for 3 years etc. [2500(3000) ha.]	52600 (16075)	5 years	Hill Forests Covering 10 F. Divisions:	57.561(17.742)

Project	Components	Activities	Total Area (FIP Area)/Total Unit (FIP Unit)	Phasing (How many years)	Total Zones Covering Districts/F Divisions [FIP Zones Covering Districts/F Divisions]	Total Budget (In Million US$) (FIP Budget)
	1.2 Community identification, engagement, capacity building etc for hill forests	a. Community identification, group formation & institute development (PBSA, peoples forum, REDD+ stakeholder forum with dependent people, capacity building training etc. b. NGO support, AIG activities to reduce degradation, climate resilience and livelihood improvement, value chain study, revolving fund etc. c. Market development support	15000 hhs (5000 hhs)	5 years	Hill Forests Covering 10 F. Divisions:	16.641(5.883)
	1.3 Management, monitoring logistics and maintenance	a. Management and monitoring including logistics for 10 F. Div b. Maintenance for 10 F. Div	52600 ha (16075 ha)	5 years	Hill Forests Covering 10 F. Divisions:	2.750(1.375)
						76.952(25.000)
2. Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink	2.1 Private land restoration for enhanced carbon sequestration	a. Identification of farm lands, homesteads, marginal lands etc., prepare restoration plan including GIS map and identify species etc.[18000 (18000)ha.] b. Quality seedling raising by BFD at FENTC &SFPC/purchase from private nursery for distribution (@ 2500 seedling per ha.) and campaign for planting including 3 years maintenance and 20 percent vacancy filling of 10000 ha. c. Coastal green belt (non-mangrove) plantation on government (non-forest) and private land (@ 2500 seedling per ha. for 8000 ha.	18000 ha.(18000 ha.)	5 years	Total 20 F. Divisions:	19.350(19.350)

Project	Components	Activities	Total Area (FIP Area)/Total Unit (FIP Unit)	Phasing (How many years)	Total Zones Covering Districts/F Divisions [FIP Zones Covering Districts/F Divisions]	Total Budget (In Million US$) (FIP Budget)
	2.2 FENTC & SFPC renovation/temporary nursery establishment	a. Improvement of nursery facilities at the FENTC & SFPC (50 nos.) b. New nursery/SFPC establishment (20 Nos.)	50 Nos.	5 years	13 S.F Divisions:	0.813(0.813)
	2.3 Capacity building of BFD frontier staffs and farmers	a. Extension training of BFD staffs of Social Forestry Zones(200 officials) b. Training of farmers for planting techniques and maintenance (18000 farmers) c. Training module preparation and publication (LS)	200 Persons	5 years	13 S.F Divisions:	1.038(1.038)
	2.4 Management & monitoring including logistics	a. Management & monitoring including logistics (for 20 F. Div) b. Maintenance (20 F. Div)	Total 20 F. Divisions 18000 ha.:	5 years	Total 20 F. Divisions:	3.800(3.800)
						25.000(25.000)
3. Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon	3.1 Forestland survey and settlement of updated record	a. Survey of forestland involving DLRS including updating of forestland records boundary and fixing RCC pillar (2'X2'X6') @ 2 Nos. per ha. b. Digitization of forestland boundary maps using GIS /RS technology in the forest area c. Secure publicly on-line accessible land records and tenures & GIS-RS maps - meeting & dialogue d. Reclamation of encroached forestland and clustering of settlers (@ households)	Total area 125,240 ha (FIP: 24969 ha.) and total reclamation of encroached forestland and clustering of settlers (@ households) through incentives and AIGAs: 15000 hhs (FIP: 3000 hhs)	5 Years	Hill forest and Sal forest in 3 Divisions	104.555 (20.875)

Project	Components	Activities	Total Area (FIP Area)/Total Unit (FIP Unit)	Phasing (How many years)	Total Zones Covering Districts/F Divisions [FIP Zones Covering Districts/F Divisions]	Total Budget (In Million US$) (FIP Budget)
sink conservation and sequestration in hill forests and plain land Sal forest		through Incentives and AIGAs				
	3.2 Capacity building for survey, forestland record management and strengthening forestland litigation	a. Capacity building BFD: training, survey, survey tools, forestland record management (200 officials (@BDT0.50 per officials) b. Strengthening forestland litigation and acts for protecting legal conversion and illegal encroachment	600 FD Officials (200 Officials)	5 Years	Hill forest and Sal forest in 3 Divisions	1.625(1.375)
	3.3 Project management, monitoring, logistics and maintenance	a. Project management and monitoring for 5 Years (@Tk800/- Lac per year for all Forest Divisions (@Tk200/- Lac per year in case of Dhaka Divisions) b. Logistics for 5 years (@Tk 160/- Lac per year for all Forest Divisions (Tk40/- Lac per year in case of Dhaka Division) c. Maintenance for 5 years (@Tk.800/- Lac per year for all Forest Division (Tk.200/- Lac per year in case of Dhaka Division)	Total area 125,240 ha (FIP: 24969 ha.) and total reclamation of encroached forestland and clustering of settlers (@ households) through incentives and AIGAs: 15000 hhs (FIP: 3000 hhs)	5 years	Hill forest and Sal forest in 3 Divisions	11.000(2.750)
						117.180(25.000)

2.13 Linking of Proposed Actions under FIP and Challenges Addressed: Theory of Change

Chapter 1 and Sections 2.1 to 2.9 have highlighted many of the challenges, problems and limitations of the forestry sector and forest department and the various initiatives and programmes. In this section, an attempt is made to show how the proposed initiatives under FIP directly address the challenges and problems facing the sector. (Table 2.13)

Table 2.13: Challenges, problems and limitations of the forest sector in Bangladesh and strategies for addressing them under FIP

Challenges/ Limitations	Options to Address them under FIP
Limited area under forests and area under natural forests outside Sundarbans - Out of 1.43 Mha under BFD control, only 700,000 is natural forest, of this 600,385 is in Sundarbans and 79161 ha in CHT	Project 1 aims at forest restoration and reforestation of degraded lands and deforested hill forest lands leading to carbon sequestration and promotion of climate resilience
Degradation of natural forests, especially in Sal and CHT forests due to - Over exploitation or unsustainable exploitation levels - Illicit removal - Slash and burning - Intentional burning and shifting cultivation - The current exploitation of State forests beyond the land's natural productive capacity, rapid deterioration of forest resources, land degradation occurring from misuse, and forest resources that largely remain unproductive	Project 1 has specific components aimed at regeneration of Sal and CHT forests
Loss of forest land and demand for forest land - Encroachment of forest land (68,538 ha encroached), particularly in CHT - Transfer of forest land to non-forestry purpose (according to BFD 125,626 ha) - Absence of boundaries and lack of secure tenure land records - Lack of staff to enforce forest laws - Demand for and conversion of forest land to agriculture	Project 3 aims at Land survey, updating land records, demarcation of forest boundary, zoning of forest land, secure forest land tenure which would assist the BFD and other governmental agencies to enforce forest conservation laws and acts. Further capacity building and staff strengthening will facilitate forest law enforcement.
Loss of biodiversity - Loss of sal and hill forests - Degradation of natural forests and habitat loss - Inadequate staff and logistics - Afforestation dominated by exotics and monocultures	Project 1 aims at restoration of degraded forests and hill forests. Further, the project proposed also aims at building capacity in the communities through community engagement. This may lead to conservation of biodiversity.
Climate change - Lack of consideration of climate change in afforestation and forest management and impact on forest dependent local communities and coastal communities	Project 1 aims at promotion of forest restoration by adopting climate resilient practices. Incorporation of alternate livelihoods to diversify income sources also contributes to building resilience in the forest dependent communities.
Imbalance between demand and supply for fuelwood, timber and industrial wood and limited effort to promote forestry on private lands. - Lack of budget support, extension support, seedlings supply - Lack of capacity in BFD for nursery and seedling supplied - Lack of value chain	Project 2 aims at promotion of tree planting in fallow lands, under agroforestry and homestead gardens leading to production of industrial wood, timber and fuelwood, aimed at meeting the biomass demands. Project 2 also aims to provide infrastructure support to private nurseries and also build the extension capacity of BFD.

2.14 Carbon Sequestration Potential of Proposed Projects under FIP

The World Bank Environment Strategy (2012) adopted a corporate mandate to account for the greenhouse gas (GHG) emissions for investment lending. The quantification of GHG emissions is an important step in managing and ultimately reducing emissions, as it provides an understanding of the project's GHG mitigation potential. Further, Paris Agreement also mandates reporting of assumptions and methodological approaches including those for estimating and accounting for anthropogenic greenhouse gas emissions to achieve the goals of Article 2.

Accounting methodology

The World Bank has adopted the Ex-Ante Carbon-balance Tool (EX-ACT), developed by FAO in 2010, to estimate the impact of agricultural investment lending on GHG emissions and carbon sequestration in the project area. EX-ACT is a land-based appraisal system that allows the assessment of a project's net carbon-balance, defined as the net balance of CO_2 equivalent GHG that are emitted or sequestered because of project implementation compared to a no project or without project scenario. EX-ACT captures project activities in following five modules: land use change, crop production, livestock and grassland, land degradation, inputs and investment. EX-ACT estimates the carbon stock changes (emissions or sinks), expressed in equivalent tons of CO_2 per hectare and year.

All the three projects proposed in Table 2.12 have the potential to lead to forest carbon stock conservation and carbon sequestration. Under the FIP, 16,075 ha of degraded forests will be restored and 18,000 ha of private lands will also be brought under agroforestry, homestead gardens and planting trees outside the forests. These restoration and tree planting programmes will lead to carbon sequestration. The carbon sequestration is estimated using Ex-Act tool developed by FAO. The total carbon sequestered of the project 1 and 2 are presented in Table 2.14. Project 3 also indirectly contributes to carbon stock conservation by reducing forest conservation or encroachment and illegal felling of trees.

The net carbon sequestration benefits estimated using Ex-Act tool for a period of 20 years is 7.59 $MtCO_{2\text{-}eq}$ for the 16,075 ha considered under Project FIP-1. Similarly, the net carbon sequestration benefit estimated for Project FIP-2 (Trees outside Forests) is 8.51 $MtCO_{2\text{-}eq}$, considering an area of 18,000 ha. FIP-3 aimed at forest conservation (on 24,969 ha) is projected to lead to a conservation of Carbon sink of 4.72 $MtCO_2$-eq.

Table 2.14: Carbon sequestration potential of proposed projects under FIP

Projects	Components	Area	Total C sequestration in 20 years of the total project area ($tCO_{2\text{-}eq}$)
Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests	1.1 Restoration/ reforestation of degraded and deforested hill forestlands through SFM	Total: 52,600 ha FIP: 16,075 ha	-24,861,237 (Total area) -7,597,802 (FIP Component)
	1.2 Community identification, engagement, promoting AIGs and capacity building in the Hill forest areas	Total: 15000 HHs FIP: 5000 HHs	
	1.3 Strengthening BFD, improve management, monitoring, logistics	Total: 52600 FIP: 16075	

	and maintenance		
Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink	2.1Tree planting on private lands for meeting biomass needs and enhanced carbon sequestration	18000 ha	-8,507,648
	2.2 FENTC & SFPC renovation/temporary nursery establishment	50 Nos.	
	2.3 Capacity building of BFD frontier staffs and farmers	200 Persons	
	2.4 Management & monitoring including logistics	18000 ha	
Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plain land Sal forest	3.1 Forestland survey and settlement of updated record	24,969 ha	4,728,401
	3.2 Capacity building for survey, forestland record management and strengthening forestland litigation		
	3.3 Project management, monitoring, logistics and maintenance		

Chapter 3: Policy and Regulatory Environment

3.1 Introduction: Evolution of Forest Policies

The FIP must be consistent with the Bangladesh national Forest and Land use policies. Further, the FIP should aim at meeting the goals, objectives, and targets set out in the National Forest Policy, 7th Five Year Plan, etc. Thus, in this Chapter the Bangladesh Forest, Land use and Agricultural policies are briefly presented to ensure that there is synergy between FIP and these policies.

The Forest Department (FD) under the Ministry of Environment and Forests (MoEF) is the custodian of forests and wildlife for the entire country. The forest lands of Bangladesh have been primarily managed by Forest Department. In the recent years, the government is strengthening its commitment to conservation forestry including biodiversity conservation. The forest policy in Bangladesh has evolved from its origins in the colonial past. The first formal forest policy to be enunciated in what was then British India came into effect in 1894. It was focused on progressive commercialization of forest use for revenue maximization and expansion of agriculture land by converting forests for commercial farming.

Section 12 of the Constitution (Fifteenth Amendment) Act, 2011 (Act XIV of 2011) provides a new Article 18A to safeguard the natural resources, biodiversity, wetlands, forests and wildlife for the present and future citizens. The Forest Act of 1927 (Act XVI of 1927) and the Wildlife (Preservation) Order, 1973 (P.O. 23 of 1973) substituted by the Wildlife (Protection and Safety) Act, 2012 (Act No. 30 of 2012) provide legal protection to forests and wildlife, respectively. The Forest Act of 1927 was amended in 1989 to provide deterrent penalties for certain forest offences and further modified in 2000 to provide for social forestry.

Even though some form or the other of forest management had long been practiced in the Indian sub-continent, the British rulers were the first to introduce management of 'forest estates', which were initially managed through the civil administration. Eventually, the management of forests was vested with the Forest Department after its establishment in the mid-nineteenth century. While the first Forest Act was promulgated in 1865, the First Forest Policy came into effect only in 1894. The main focus of that policy was supporting the process of reservation of forest land and the exploitation of its resources for revenue generation.

The Government of Bangladesh adopted the first National Forest Policy in 1979 with the objective of providing greater protection and placing greater emphasis on conservation of the country's forest resources while developing its agricultural and industrial economies. This 1979 policy did not provide adequate opportunity for community participation and, was largely in line with the traditional colonial-industrial approach to forestry. The Forest policy of 1994 recognized the importance of community participation in forestry. The National Forest Policy, 1979 emphasized the use of forest land only for forestry purposes, enhancement of plantation programmes, establishment of modern wood based industries, reorientation of research, education and training programmes to meet the required needs and updating of laws governing the administration of forests.

3.2 The National Forest Policy in 1994

The National Forest Policy in 1994 highlighted the need for achieving 20% of the land area under forest cover by 2015, which involved plantations in available forest land, private

homestead land and public institutions roadside, railway tracts side, embankment slopes as well as in un-classed forests in the hill districts. The 1994 Forest policy highlighted the need for public involvement in forestry activities. This facilitated a shift in the attitude of Forest Department towards local community, ultimately leading to establishment of "Social forestry". Some of the relevant provisions of the currently prevailing 1994 Forest Policy, relevant to FIP, are as follows:

- The government shall endeavour to bring 20% of land under forest by the year 2015 to maintain the ecological balance and attain self-sufficiency in forest produces. To achieve this objective the government shall work jointly with Non-Government Organizations and ensure peoples participation.
- Since the area under government-managed forest is very limited, the afforestation activities shall be extended to village areas; newly accreted mud-flat areas and in the denuded areas of un-classed state forests of Chittagong Hill Tracts.
- People will be encouraged to plant trees in their own fallow and marginal land, on the bank of tanks and homesteads. Technical advice and assistance will be provided for using "Agro-Forestry" practices, to the people if they introduce agro-forestry in their marginal and sub-marginal land. While introducing agro-forestry in state owned and private land appropriate attention will be given to produce fodder and in maintaining the herbs and shrubs.
- An integrated management plan will be prepared for Sundarbans incorporating the management of forest, water and wildlife.
- State owned Hill and Sal forests will be managed as production forest except those declared as "Protected Areas" for preserving soil, water and biodiversity. The production forests will be managed on commercial basis with due consideration to environment.
- The critical areas like steep hill slopes, vulnerable watersheds, wetlands will be designated as 'forests' and will be managed as Protected Areas.
- Denuded and encroached government forest lands will be identified and brought under afforestation programme with peoples' participation on benefit sharing approach preferably under agro-forestry wherein NGOs may be associated.
- Due to shortage of forest area in the country, no forestland will be allowed to be used for any purpose other than afforestation, without the permission of the head of the government.
- Under forestry programmes, fruit tree planting shall be encouraged in addition to timber, fodder, fuelwood trees and other non-wood products, in the habitations.
- Forest Department will be strengthened to achieve the objectives and goals of the policy and a new social forestry department will be established.

The 1994 Forest Policy is reasonably elaborate and incorporated and advocated the participatory forestry concept in clear terms. This has opened up the avenue of co-operation between NGOs and Government Agencies in the area of social forestry. The 1994 policy was comprehensive and encouraged participation of communities and NGOs.

However, the National Forest Policy of 1994 would require changes due to the emerging national and global environmental challenges. Some of the potential challenges that need to be incorporated into forest policy are as follows:

- Climate change is likely to adversely impact forests and biodiversity and the impacts are likely to be irreversible
    - Need for building resilience in forest ecosystems
- Vulnerability of forest dependent communities to increasing climate variability and climate change
    - Need for building resilience in forest dependent communities
- Adoption of sustainable forest management practices
    - To sustain biodiversity, carbon stocks, and livelihoods
- Conserving and enhancing carbon sinks to mitigate climate change
    - REDD+, CDM in Afforestation/Reforestation, agro-forestry
- Community empowerment and management, developing community institutions and building capacity
- Addressing new demands on forest products and forest land
- Integrated land use management; land allocation to food production, livestock management, forestry, bio-fuel production, carbon mitigation, biodiversity conservation, etc.
- Delivery of ecosystem services considering the economics of ecosystem and biodiversity
- Synergy/convergence of forest policy with multilateral environmental agreements;
    - UNFCCC, CBD, RAMSAR, SDGs. etc.
- Building institutions and technical capacity in Forest Department to cope with these challenges
- Need for developing and adopting sustainable forest management principles and practices
- Developing plans for seeking funding from the traditional and new multilateral and bilateral funding sources relevant to climate change, biodiversity, mangrove restoration, etc.
- Meeting international commitments to multiple Environmental Conventions such as the United Nations Framework Convention on Climate Change, Convention on Biodiversity, Ramsar Convention and Convention to Combat Desertification, etc.

3.3 Draft Forest Policy 2016

Given the new challenges facing the forest sector, Government of Bangladesh initiated a process to develop a new forest policy to address the current and the emerging challenges. The new Forestry Policy draft has been prepared after an extended process of national consultations and reviews. The revision was necessitated by the emergence of new environmental and socioeconomic changes in the context of climate change and extensive loss of forest cover in the country in the recent decades. The Draft National Forest Policy covers the following aspects:

- Enrichment and extension of forest cover
- Protection of existing forests
- Promotion of Trees Outside Forests
- Biodiversity and wildlife conservation
- Promotion of Participatory forestry
- Development of National parks and recreational areas
- Forestry education and capacity building
- Climate change: Mitigation and Adaptation
- Promotion of forestry research

- Promotion of non-timber forest products
- Promotion of effective forestry administration.

Vision of FP: *"The main aim of the policy is to manage all existing forests, wildlife and other forestry resources, adhering to the principles of sustainable management and climate resilience; enrich degraded forest areas; and enhance land areas under forest/tree cover; to produce a wide array of goods and ecosystem services for the benefit of Bangladesh's present and future generations"*

3.3.1 Long term and short-term goals of the sector proposed in the Draft Forest Policy

The long term and short-term goals of the forest sector proposed in Draft Forest Policy are as follows:

- The Forest Department will be responsible for conducting all forestry activities on state owned forest land and will support, advise and guide tree planting activities in all other available land in the country.
- Given the acute shortage of forest land, henceforth, no forest land will be released for any non-forestry activities without the prior approval of the Honorable Prime Minister with a vetting from the cabinet. In cases involving priority national interest, equal areas will be handed over to the Forest Department, with required fund for compensatory afforestation. Necessary rules to be formulated to that effect.
- Coordination with all other relevant agencies on forestry related matters will be done by the Forest Department and the Ministry of Environment and Forests.
- Adequate funds shall be made available from the national budget as well as external sources to address routine activities and emerging challenges.
- Traditional rights of various ethnic-communities, living in and around state forest areas, will be recognized and maintained with due respect to their forest-related cultural values and religious beliefs. Conservation initiatives related to forest, wildlife and biodiversity by indigenous communities will be encouraged.
- Undertake a credible valuation of the ecosystem services that the forestry sector provides in Bangladesh.
- Establish a properly staffed and equipped information management, monitoring and evaluation unit for information generation and assessment of the national forest programme under the Forest Department.
- Ensure fulfillment of relevant provisions of all Multilateral Environmental Treaties and Conventions, including the Paris Climate Agreement, which Bangladesh has ratified.
- Translate relevant forestry related recommendations from the Sustainable Development Goals as well as Bangladesh's Seventh Five-Year Plan into programmes and projects.
- Enhance capacity for forestry research and education.

3.3.2 Key forest policies related to climate change mitigation and adaptation

The Draft Forest Policy has given adequate importance to addressing climate change. Some of the key elements related to "Climate Change Mitigation and Adaptation" are as follows:

- Strengthen resilience of forest ecosystems and dependent communities to Climate Change.

- Maintain maximum area possible under tree cover and ensure through proper actions that deforestation is totally arrested.
- Develop and implement programmes and projects aiming at mitigation and adaptation against adverse impacts from climate change.
- Strengthen the capacity of the Forest Department to support climate resilience and low carbon development through integrating climate change issues into planning and implementation of strategies.
- Create massive carbon sinks for carbon sequestration by bringing more areas under tree cover.
- Develop and implement awareness raising strategies and capacity development programmes on the opportunities for adaptation and mitigation measures as per the climate change action plan.
- Establish and strengthen research capacity for climate change and related environmental issues and their possible impacts on forest formations.
- Involve, build capacity and empower communities in mitigating and adapting to climate change.
- Undertake research for identifying suitable tree species for different plantation programmes, which are efficient in carbon sequestration.
- Given the higher efficiency of mangrove species in carbon fixing, undertake enhanced plantation programmes in coastal areas and offshore islands.
- Create a 'coastal green belt' of thick mangroves and other suitable climate resilient species to reduce vulnerability of coastal communities to the impact of climate change induced disasters.
- Commitments made at the Paris Climate Change Meeting and in the Intended Nationally Determined Commitments regarding LULUCF, shall guide the future forestry activities in the country.
- Enhancement of forestry carbon stocks and generation of benefits through mechanism such as Clean Development Mechanism, Reduced Emission from Deforestation and Degradation Plus (REDD+) shall be among the main objectives of future forestry programmes.
- Formulate a climate financing mechanism that will help the country to take advantage of new and emerging climate change funds like REDD+, Forest-Carbon Partner facility, Green Climate Fund, and other available sources and also, include innovative ways to fund climate change actions domestically through accessing Bangladesh Climate Change Resilience Fund and support from other governmental allocations and other local sources.
- Develop a monitoring, reporting and verification system for the evaluation of emission reduction to ensure full access to REDD+ facility. Establish a national carbon trading platform and also, introduce payment for ecosystem services as a source of funds for climate resilience related activities.
- Generate knowledge regarding the impact of climate change on forest ecosystems, forestry resources and forest dependent communities through undertaking relevant studies and research.

The forest policy has already gone through extensive consultation process even including Forest Department and other relevant departments. Currently, it is being currently considered by the Government of Bangladesh.

3.4 Implications of Draft National Forest Policy for Forest Investment Programme

The new Draft National Forest Policy is very critical for planning, designing, implementation and monitoring of the proposed activities under the FIP. Some of the critical elements of Draft Forest Policy and their implications for FIP are presented in Table 3.1. It can be observed that most of the elements of the proposed draft forest policy will facilitate implementation of FIP activities. FIP has considered all aspects of "Climate Change, Mitigation and Adaptation".

Table 3.1: Implications of Draft National Forest Policy for FIP

Element of Draft Forest Policy	***Implications for FIP***
The Forest Department will be responsible for conducting all forestry activities on state owned forest land and will support, advise and guide tree planting activities in all other available land in the country.	- This policy is critical for implementing FIP Project 3 and 2, proposed in the FIP. - Under FIP-2, BFD will support, advise and guide tree planting on private lands.
Given the acute shortage of forest land, henceforth, no forest land will be released for any non-forestry activities.	- This policy will be facilitated by implementing FIP-3.
Strengthen resilience of forest ecosystems and dependent communities to Climate Change.	- Project 1, 2 and 3 mainstream resilience to climate change risks and incorporate forest management practices and AIGAs to promote resilience.
Create a massive carbon sinks for carbon sequestration by bringing more areas under tree cover.	- Project 1 and 2 aim to conserve and expand carbon sink in Bangladesh, by conservation, restoration and afforestation activities.
Ensure fulfillment of relevant provisions of all Multilateral Environmental Treaties and Conventions, including the Paris Climate Agreement. Commitments made at the Paris Climate Change Meeting through INDC regarding LULUCF, shall guide the future forestry activities in the country.	Project 1, 2 and 3 would assist the GoB and BFD to achieve many of the targets set under INDC and Biodiversity Convention
Establish a properly staffed and equipped information management, monitoring and evaluation unit for information generation and assessment of the national forest programme under the Forest Department.	Project 1 aims at mainstreaming climate resilience in restoration of Sal and Hill forests. Further, capacity building activities are included.
Strengthen the capacity of the Forest Department to support climate resilience and low carbon development through integrating climate change issues into planning and implementation of strategies	Project 3 aims at strengthening BFD and building capacity to enforce forest laws. This requires research, tools and techniques to integrate climate change resilience into all forest conservation and regeneration programmes.
Enhancement of forestry carbon stocks and generation of benefits through mechanism such as CDM, Reduced Emission from Deforestation and Degradation Plus (REDD+) shall be among the main objectives of future forestry programmes.	The FIP, apart from the three main projects, has several components which could be expanded into independent projects for seeking funding under REDD+ mechanisms.
Develop a monitoring, reporting and verification system for the evaluation of emission reduction to ensure full access to REDD+ facility. Establish a national carbon trading platform and also, introduce payment for ecosystem services as a source of funds for climate resilience related activities.	This component is included in FIP 1 and 2 projects proposed under FIP.

3.5 7th Five Year Plan Polices for the Forest Sector

The key policies and programmes under 7th Five Year Plan that are relevant to FIP are presented in Table 3.2. The Table indicates that the proposed FIP activities contribute to achievement of the 7th Five Year plan goals for the forest sector.

Table 3.2: 7th Five Year Plan Policies and Programmes and their Implications for FIP

7th Five Year Policies and Programmes	***Implications for FIP***
Necessary programmes will be taken to improve quality and increase tree density of the existing forests and older plantations through 'enrichment planting' and 'assisted natural regeneration'.	The Project FIP-1 aims at promoting regeneration and restoration of existing degraded forest land.
An estimated 50,000 ha. land of hill forest and 5,000 ha. of plain land forest will be planted during the plan period. Productivity of plantations will have to be increased manifold. Multi-purpose trees will receive special attention to increase the productivity of land under forest.	Project FIP-1 has a target of restoring 16,075 ha of degraded and deforested hill forests.
People's participation will be continued in all buffer zone of forests. Integration of tree plantation and crop cultivation will be practiced.	Community participation is an integral part of all the projects and components of FIP.
Programme to rehabilitate the degraded Sal Forests will be taken up as part of important development activities.	This is an important component of Project 1 aimed at Sal forests.
Emphasis will be given for forest land survey and updating the land record. Initiative has been made through formulating project which is expected to be implemented during the Five Year Plan. Forest areas will be demarcated to avoid unlawful encroachments.	Project 3 is directly aimed at updating the land records and demarcating forest boundary.
Effective participation of NGOs/ CBOs shall be ensured in the decision-making process of co-management.	This is an integral component of all the projects under FIP.

3.6 Relevance of National Agriculture and Land Use Policies

Land use and National Agriculture Policies are directly relevant to FIP. These two policies determine the land availability for FIP investments and the tenurial status of the land for sustained forestry.

3.6.1 National Agriculture Policy

The objectives of the National Agriculture Policy 2013, relevant to the forestry sector include:

- Ensure a profitable and sustainable agricultural production system;
- Preserve and develop agriculture land productivity;

- Take necessary steps to ensure environmental protection as well as 'environment friendly sustainable agriculture' through increased use of organic manure and strengthening of the Integrated Pest Management (IPM) programme;
- Establish agriculture as a diversified and sustainable income generating sector through strengthening of 'Farming System' based agricultural production and agro-forestry programmes.
- Inclusion of agro-forestry in the agricultural policy opens the window for developing synergy with the forestry sector. The policy also provides that "Maximum utilization of land will be ensured through promotion of inter-cropping with the main crops" which provides potential for another link with the forestry sector through intercropping with forestry species. This policy has no contradiction with forest policy. However, at times conflicts may crop up in fixing the priority between forestry and agriculture, with respect to fallow lands.

The National Agriculture Policy is directly relevant to FIP, since agroforestry and the trees on farms are critical components of FIP. Thus, National Agriculture Policy directly supports one of the key investment opportunities in forest sector.

3.6.2 National Land Use Policy

National Land Use policy is very critical for conservation and development of forest lands. In a country like Bangladesh with limited land resources and high population density, there is always pressure on forest land which is publicly owned. The salient features of the national land use policy are as follows:

- Emphasis on the protection of declining cultivable lands of the country.
- It has the guidance to go for intensive agriculture and expansion of fisheries, at the same time it has enunciated that forestry can play a significant role in poverty alleviation.
- It has laid ample emphasis on the zoning and has suggested formulation of "Zoning Laws".
- It has expressed concern over the engulfment of cultivable land by rural housing and suggested house planning at rural level.
- It has emphasized on "austerity in land use" with a specific suggestion of putting minimal land under buildings.
- It has expressed concern over misuse of acquired lands.
- It has suggested rehabilitating the landless poor on new chars.
- It has identified that forestry can combat pollution and has suggested undertaking afforestation and preservation of existing forest areas.
- For coastal belt areas it has the target to go for agriculture and rehabilitation but along with others have suggested for a 'functional green belt' along the coast.
- It has suggested controlling fragmentation of land to a limit of 'logical unit'.
- To release the pressure on land it has suggested using the flood prevention dams as roads and highways.
- It has suggested a Certificate of Land Ownership Scheme to combat illegal occupation of government land.
- It has identified that people's awareness is a must for successful implementation of the policy.

The land use policy has several progressive features, such as zoning laws, austerity in land use, preservation of existing forests and promotion of afforestation and functional green belt. The proposed Projects under FIP contribute to strengthening of Forest Department to enable forest sector to contribute to economic development. Further, FIP-3 will facilitate identification, boundary demarcation and secured land tenure to government controlled forest land and promote National Land Use Policy.

3.7 Adequacy of the Existing Forest Policy, National Land Use Policy and National Agricultural Policy

There are many positive elements as highlighted above and summarized below in the existing Forest Policy, National Land Use Policy and National Agricultural Policy. Some of the positive elements in the existing policies which are relevant to promoting the FIP interventions are as follows:

- Identification of agroforestry and integrations of trees with annual crops as important interventions, by the National Agriculture Policy, supports one of the key components of the FIP. Thus, there is synergy between Agriculture Policy, National Forest Policy (1994 and 2016) and the FIP component of agroforestry.
- National Land Use Policy has identified forestry - in particular, preservation of existing forests as a critical component of National Land Use policy. Thus, this policy is consistent with the FIP 3, which facilitates enforcement of forest laws and conservation of forests.
- The National Land Use Policy had also suggested "Certificate of Land Ownership" Scheme to prevent unauthorized occupancy of public land. Forest land and public land are very critical for biodiversity and ecosystem services and also for implementation of FIP interventions. FIP-3 facilitates secure land tenure for forest land.

Thus, in general, there are many elements of National Land Use Policy and National Agricultural policy which are relevant to facilitate implementation of FIP activities.

The Forest Policy of 1994 has many elements which are critical for implementation of FIP. Some of the elements of the National Forest Policy, 1994 that could facilitate the implementation of FIP are as follows:

- Target of achieving 20% of national geographic area under forest or tree cover: This policy will enable expansion of area under forest proposed under the FIP.
- Expansion of afforestation/reforestation, agroforestry and planting of fruit trees in fallow and marginal crop lands: This will facilitate the agroforestry/homestead forestry under the FIP.
- Ban on conversion of forest land: This will facilitate implementation of FIP, aimed at forest conservation and halting deforestation.
- Strengthening and capacity building of Forest Department: This is a necessary condition for implementation of FIP.

Regarding the Draft National Forest Policy, 2016 it is unclear when the policy will be operational. However, there are many limitations in the existing Forest, Land Use and Agriculture Policies to bring about a transformational change in forest sector and to facilitate implementation of FIP. Most of the limitations have been addressed in the Draft National Forest Policy.

3.8 Polices for Transformational Change in the Forest Sector and Implementation of FIP

The transformational change in forest sector would involve the following key components; many of them will be addressed in the FIP.

- Forest Policy, 1994 and 7th Five Year Plan target of achieving 20% of land area under forest or tree cover and forests to have 70% crown density. (FIP-1 and 2)
- Halting deforestation or conservation of all existing natural forests. (FIP-3)
- Meeting all the biomass (fuelwood, timber, pulpwood, etc.) needs from plantations, tree plantations/agroforestry in fallow and marginal lands, homestead gardens, etc. (FIP-2)
- Reclaiming Sal and CHT, through natural regeneration and protection to promote biodiversity and ecosystem services.
- Promotion of climate resilient afforestation/reforestation practices along with AIG (Alternate Income Generation) activities to enhance the resilience of forest dependent communities. (FIP-1)

The big challenge is to identify the transformational policies required to promote the above goals to achieve transformational change in forest sector (Table 3.3). Infact, the Forest Policy of 1994 has many provisions, but are not backed by adequate legislations or acts and adequate authority to the forest department to enforce the policies.

Table 3.3: Transformational policies required for meeting the broad goals for the forest sector

Transformational policies	Implications for FIP and achieving goals set for forest sector
Policies aimed at secure land tenure for forest lands and zoning of forest lands: through lands survey, secure boundary and demarcation of forest land, publicly accessible remote sensing and GIS maps of natural forests (such as Sal and Hill Tract forests).	- Critical for conserving existing forests, halting forest encroachment, unauthorized forest land conversion to other activities, enabling BFD staff to enforce regulations. This is a first transformative step in promoting REDD+ strategies in Bangladesh. This is being targeted under FIP-3 Project.
Clear forest conservation policy to halt all conversion of existing natural forests (such as Sal and Hill Tract forests) to non-forestry purposes.	- This is a transformative policy, since forest loss continues in Bangladesh, despite having very little natural forests. National Forest Policy of 1994 states this policy, but there are no adequate laws to help forest department to enforce the policy.
Policy for enhanced funding and budgetary support for forest conservation, afforestation in public lands, providing extension service to farmers and private sector, promoting AIGs.	- There is a need for policy shift at the National level to give increased importance to forest sector in the Five Year plans. This requires provision of adequate funding to forest sector. Further, BFD should also play critical role in Afforestation of private lands by providing seedlings and extension services to farmers and homestead owners.
Policies to strengthen co-management with clear legal provisions and secure rights to communities on benefits and responsibilities.	- Transformational policies may be required to ensure adequate powers to the local communities and provide legal authority to community institutions in managing forests in public, community and private lands.
Policy support to expand the forest department staff strength, to build capacity and for provision of adequate infrastructure	- GoB will be required to give higher level of importance to forest sector and forest Dept. The Govt should increase the staff and improve the infrastructure and facilities for the forest

facility to enforce the laws and regulations expanding the staff of BFD, building research and monitoring infrastructure and capacity.	Dept, and also finally provide adequate authority to manage the forest lands.
Policy for mainstreaming Climate Change Mitigation and Adaptation in all programmes and projects of the forest sector.	There is a need for this policy. The FIP 1 to 3 aim to facilitate this. But, there is a need to incorporate mitigation and adaptation in all programmes by building adequate technical and research capacity.

Chapter 4: Expected Co-Benefits from FIP Investment

4.1 Introduction

According to IPCC (2014), most forestry mitigation or carbon sequestration projects have the potential to generate multiple environmental and socio-economic co-benefits such as: biodiversity conservation, land reclamation, water conservation, employment generation and generation of multiple ecosystem services. However, there could be trade-offs such as loss of biodiversity and enhancement of vulnerability to climate change risks, due to for example, promotion of monoculture of exotic species. Thus, it is very critical to ensure that concerns of biodiversity and ecosystem services are addressed in all forest sector mitigation programmes and projects. Further, vulnerability and risk of climate change on forest sector also needs to be addressed to sustain carbon benefits, biodiversity and ecosystem services. In this context, building resilience component into all forest investment programmes is necessary. In all the projects proposed in the FIP, biodiversity and resilience objectives will be included, to ensure that there are no trade-offs and environmental benefits are delivered. Some of the examples of the environmental, socio-economic, institutional and climate resilience co-benefits are listed below and presented in Table 4.1 to Table 4.8 for the three Forest Investment Projects and components proposed under FIP in Chapter 2 and 6. The climate change mitigation or CO_2 sink conservation and expansion is the main benefit of the FIP and is estimated and provided in Chapter 2 and Table 2.14. The direct and indirect impact of FIP activities on employment and income generation leading to reduction of poverty are presented in this chapter.

All the proposed projects under the FIP incorporate the following critical principles to ensure delivery of sustained environmental, climate resilience, socio-economic and institutional co-benefits, along with mitigation of climate change through carbon sink expansion.

- **Environmental Co-benefits**: Conservation of carbon sink and enhancement of carbon stocks, synergistically contributing to conservation of biodiversity, protection of watersheds and reclamation of degraded forests and lands.
- **Socio-economic Co-benefits:** All FIP activities will provide multiple forest products, income and employment generation benefits, contributing to enhancement of livelihoods. Further, through AIGAs for forest dependent communities, incomes sources could be diversified.
- **Institutional Co-benefits:** All the three proposed projects and components are expected to strengthen the forest departments and NGOs and build capacity in BFD, NGOs and local community institutions.
- **Climate resilience**: All the FIP activities must incorporate climate resilience practices to ensure sustained carbon mitigation benefit; through promotion of multi-species and native species dominated forestry, fire protection and management, anticipatory planting of tree species, linking forest fragments, creation of corridors, etc.

4.2 Framework for Assessment of Co-benefits

In the following sections, environmental, socio-economic and institutional co-benefits that could be derived from FIP activities are presented. If any trade-offs, they will be identified to enable addressing them at project development phase.

IPCC Framework: IPCC, 2014 has provided a framework for assessing the co-benefits and adverse side-effects from forestry and land use mitigation measures. These effects depend on the specific context as well as the scale of implementation. IPCC framework includes assessment of potential co-benefits and adverse side-effects with respect to institutional, environmental, economic and technological aspects.
The impacts of the projects are assessed for the co-benefits and if any adverse side-effects at local and national scale. In this chapter, all the FIP projects and components are assessed to ensure co-benefits are enhanced and any adverse side-effects are identified and avoided.

Project FIP-1: Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests

This project has three components under the FIP. These components firstly, aim to restore and regenerate degraded and deforested forestlands with resilient species and enhance management efforts in developing multi-storied forests to maximize carbon sequestration in forestlands; secondly, aim to enhance carbon sequestration, climate change resilience and biodiversity conservation in forest ecosystems, through forest restoration and afforestation/ reforestation, and thirdly, aim at strengthening BFD and local community institutions. It has the potential to provide a large number of multiple environmental, socio-economic and institutional co-benefits, apart from enhancing the carbon stocks in forest sector to mitigate climate change.

Environmental benefits: Forest restoration in degraded forest lands will lead to carbon sequestration in biomass and soils, in addition to co-benefits such as biodiversity conservation, reclamation of forest degraded lands, soil fertility improvement and reduction in soil erosion. Under this project, carbon sequestration occurs synergistically with other environmental co-benefits.

Socio-economic benefits: Forest restoration and planting trees on farms and homesteads could lead to production of timber, fuelwood and NTFPs, employment generation in collection and processing of forest products, increased income from employment, diversification of sources of income leading to resilience of forest dependent communities. With appropriate institutional measures, access to forest products to communities and in particular, to women could be increased.

Institutional benefits: Strengthening of BFD and capacity development are critical for generating climate change mitigation benefits. Development of partnership between forest department, NGOs and rural communities, along with improved management will contribute to capacity development in BFD staff and forest dependent rural communities.

Climate Resilience: Natural regeneration and restoration of hill forests, plain land Sal forests will enhance the adaptive capacity of forests to projected climate change. Further, promotion of alternate AIG activities, NTFP yielding trees and creation of sustained access to forest products will contribute to enhancing the resilience of the forest dependent communities.

The detailed environmental, socio-economic, institutional and climate resilience co-benefits and if any adverse side effects are presented for the four components of Project 1, proposed under FIP in Chapter 2 and 6 in Tables 4.1 to 4.3.

*Table 4.1: **Project FIP-1**: Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests. **C 1.1** Restoration/ reforestation of degraded and deforested hill forestlands*

Components	***Environmental Co-benefits***	***Socio-economic Co-benefits***	***Institutional Co-benefits***	***Climate Resilient Co-benefit***
C 1.1: Restoration/ reforestation of degraded and deforested hill forestlands	**DIRECT** 1. Regeneration of native Sal and hill forests **(+++)** 2. Carbon sequestration from forest restoration and reduced pressure on natural forests **(+++)** 3. Biodiversity conservation through reduced pressure on forests and multi-species based forest restoration **(+++)** 4. Soil and water conservation through forest restoration. **(+++)** **INDIRECT** 1. Reclamation of degraded forest lands: Soil fertility improvement, reduction in soil erosion **(++)** **TRADE-OFFs** 1. Loss of biodiversity if monoculture plantations of exotic species are promoted. **(- -)**	1. Increased access to Sal leaves, seeds and other products 2. Direct employment generation through forest restoration activities. 3.Employment and AIG activities and Sal forest regeneration and production of timber, fuelwood and NTFPs. 4. Increased income opportunities for women, specially through AIGAs	1. Building capacity in forest departments 2. Building local community institutions and their capacity to manage the forests and AIGAs 3. Marketing linkages and institution development	1. Climate resilience enhanced through natural regeneration of biodiversity rich Sal and Hill forests. 2. Enhanced climate resilience through diversification of livelihoods and income sources through AIG activities.

Table 4.2: ***Project FIP-1****: Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests.* ***C 1.2*** *Community identification, engagement, capacity building etc for hill forests*

Components	***Environmental Co-benefits***	***Socio-economic Co-benefits***	***Institutional Co-benefits***	***Climate Resilient Co-benefit***
C 1.2 Community identification, engagement, capacity building etc for hill forests	**DIRECT** 1. Sustained carbon sequestration through forest restoration. 2. Biodiversity conservation of economically valuable tree and plant species.	1. Promotion of forest restoration will lead to enhanced socio-economic benefits such as income and employment generation through collection, processing and marketing of economically valuable tree species and AIGAs	1. Building capacity among NGOs and local communities in protection and management of restored forests. 2. Marketing linkages and institution development 3. Increased involvement of women in production and management of restored forests through co-management.	1. By promoting multi-species and native species based social forestry leading to biodiversity conservation will contribute to enhanced climate resilience 2. AIGAs will lead to diversification of incomes and livelihoods leading to enhanced resilience of communities to climate risks.

Table 4.3: ***Project FIP-1****: Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests.* ***C 1.3****: Management, monitoring logistics and maintenance*

Components	***Environmental Co-benefits***	***Socio-economic Co-benefits***	***Institutional Co-benefits***	***Climate Resilient Co-benefit***
C.1.3: Management, monitoring, logistics and maintenance	**INDIRECT** 1Enhanced staff and capacity will contribute to biodiversity conservation, carbon sink enhancement and ecosystem services generation. 2. Improved research and information dissemination will contribute to biodiversity conservation, carbon sink enhancement and ecosystem services. 3. Improved monitoring will contribute to effective forest restoration and carbon stock enhancement.	1. Enhanced staff and capacity of BFD will lead to enhanced - socio-economic benefits such as income and employment generation, - increased access to NTFPs and AIGAs	1. Building capacity in forest department, NGOs and local communities 2. Marketing linkages and institution development 3. Increased involvement of women in all the institutions and in market development 4. Improved infrastructure for monitoring carbon stock changes, biodiversity and ecosystem services.	1. Enhanced BFD capacity and research on climate resilient forest management - will enable BFD to promote climate resilience in forest conservation and forest restoration programmes.

Project FIP-2: Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink

In Bangladesh, due to limited area under natural forests and plantations in forest department lands, the growing needs of fuelwood, timber and industrial wood will have to be met from private lands. Even currently, trees on farm lands and homesteads contribute largely to meet the biomass needs of Bangladesh. The need for promoting forestry on private lands for meeting the biomass needs has been highlighted under the 7th Five Year Plan, FMP and other government programmes. Thus, the potential for climate change mitigation through planting trees on fallow or marginal lands, under agroforestry and in homestead gardens is included under FIP, where carbon sequestration is a major co-benefit. The co-benefits for Project 2 are presented in Table 4.4 to 4.7. Key co-benefits are highlighted below.

Environmental benefits: Tree promotion programmes on marginal and fallow lands and homesteads would lead to carbon sequestration in trees and soils as a co-benefit, along with biodiversity conservation, and reclamation of marginal and fallow lands, soil fertility improvement and reduction in soil erosion. Further, by meeting the various biomass needs from trees on farms and homesteads, there will be a reduction in the pressure on forests, indirectly contributing to conservation of carbon sinks and biodiversity in natural forests.

Socio-economic benefits: Tree planting on private lands will lead to production of timber, fuelwood and NTFPs and income from sale of these forest products. Production of timber, fuelwood and NTFPs will lead to employment generation opportunities in particular for women. Further, alternate livelihood opportunities arising from growing economically valuable tree species on private lands will lead to improved income and employment, in particular for women.

Institutional benefits: Large scale tree planting on private farms and homesteads could lead to entrepreneurship in private nurseries and timber marketing.

Climate resilience: Diversification of livelihoods and income sources from fruit and timber trees will lead to enhanced climate resilience of farmers and households. Planting trees near homesteads will lead to protection of homes from extreme rainfall events.

Table 4.4: ***Project FIP-2****: Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink* ***C 2.1*** *Private land restoration for enhanced carbon sequestration*

Components	***Environmental Co-benefit***	***Socio-economic Co-benefit***	***Institutional Co-benefit***	***Climate Resilient Co-benefit***
C 2.1 Private land restoration for enhanced carbon sequestration	**DIRECT** 1. Carbon sequestration in trees and soils planted on farms and homesteads. 2. Biodiversity conservation by planting valuable fruit and vegetable yielding trees. 3. Reclamation of marginal and fallow lands: Soil fertility improvement and reduction in soil erosion 4. Reduced pressure on natural forests leading to biodiversity conservation and carbon stock accumulation	1. Production of fruits, timber, fuelwood leading to income generation from sale of these products. 2. Employment generation due to processing and marketing of tree products.	1. Employment opportunities for women from tree product collection and processing 2. Poor and small farmers can participate in AIGAs 3. Opportunity for women to participate in AIGAs 4. Entrepreneurship development	1. Tree planting near homesteads will lead to protection of homes from extreme rainfall events. 2. Diversification of livelihoods and income sources from economically valuable trees grown on private land, leading to enhanced climate resilience of farmers and households from crop failures due to climate risks.

*Table 4.5: **Project FIP-2**: Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink **C 2.2** FENTC & SFPC renovation/temporary nursery establishment*

Components	***Environmental Co-benefit***	***Socio-economic Co-benefit***	***Institutional Co-benefit***	***Climate Resilient Co-benefit***
C 2.2 FENTC & SFPC renovation/temporary nursery establishment	**DIRECT** 1. Generate seedlings for planting	1. Promotion of nursery units will lead to enhanced socio-economic benefits such as income and employment generation through seed collection of growing and marketing of seedlings.	1. Increased involvement of women in nursery collection and processing 3. Development of infrastructure in rural areas through processing and marketing facilities for nurseries	1. Increased production, availability and processing of nurseries will contribute to diversification of livelihoods leading to enhanced climate resilience 2. Nurseries are normally multi-species and native species based, leading to enhanced resilience to climate risks

*Table 4.6: **Project FIP-2**: Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink **C 2.3** Capacity building of BFD frontier staffs and farmers*

Components	*Environmental Co-benefit*	*Socio-economic Co-benefit*	*Institutional Co-benefit*	*Climate Resilient Co-benefit*
C 2.3 Capacity building of BFD frontier staffs and farmers	**INDIRECT** Capacity building of forest department frontier staff and households to promote tree farming will indirectly contribute to increased tree cover leading to carbon sequestration and biodiversity conservation by promoting economically valuable fruit and vegetable trees.	Capacity building will lead to increased tree planting, indirectly contributing to increased incomes and employment	Capacity development will strengthen forest department field staff and their infrastructure.	Capacity building activities will contribute to increased awareness and knowledge about climate change and the need for building resilience.

*Table 4.7: **Project FIP-2**: Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink **C 2.4** Management & monitoring including logistics*

Components	*Environmental Co-benefit*	*Socio-economic Co-benefit*	*Institutional Co-benefit*	*Climate Resilient Co-benefit*
C 2.3 Management & monitoring including logistics	**INDIRECT** 1Enhanced staff and capacity will contribute indirectly to biodiversity conservation, carbon sink enhancement and ecosystem services. 2. Improved research on TOF planting and information dissemination will contribute to biodiversity conservation, carbon sink enhancement and ecosystem services	1. Enhanced staff and capacity will lead to enhanced - socio-economic benefits such as income and employment generation, - increased access to NTFPs and AIGAs	1. Building capacity among the farmers by promoting nurseries, homesteads and planting trees on farmlands 2. Marketing linkages and institution development 3. Increased involvement of women in all the institutions and in market development 4. Improved infrastructure for monitoring carbon stock changes, biodiversity and ecosystem services.	Enhance capacity of the BFD and improved management will indirectly contribute to better forestry, leading to resilience.

Project FIP-3: Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plainland Sal forest

Absence of secure land tenures, forest boundaries, forest maps, legal support and infrastructure within the forest department is leading to encroachment of forest land, illegal felling of trees and conversion of forest land to other purposes. These concerns have been recognized by the GoB as well as all other agencies (Chapter 2). Thus, secure land tenures, forest boundary demarcation and digitization and public access of forest land records is the first critical step in forest conservation, banning encroachment, halting deforestation and land conversion to other purposes.

This project and the relevant components will indirectly lead to the following benefits which are represented in Table 4.8.

- **Environmental co-benefits** such as forest and biodiversity conservation, reduction in forest degradation and carbon stock enhancement by reducing forest conversion and encroachment.
- **Socio-economic co-benefits** such as sustained access to economically beneficial NTFPs, employment and income generation from tourism and access to NTFPs, due to reduced or avoided forest conversion and encroachment.
- **Institutional co-benefits** such as empowerment of forest departments to enforce laws and acts from secure land tenure, maps and legal boundaries and clear tenurial rights to local communities.
- **Climate resilient co-benefit**: There will be indirect co-benefit through forest and biodiversity conservation.

Table 4.8: Project 3: Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plainland Sal forest

Components	***Indirect Environmental co-benefits***	***Indirect Socio-economic co-benefits***	***Direct Institutional co-benefits***	***Climate Resilience Co-benefit***
C 3.1 Forestland survey and settlement of updated record C 3.2 Capacity building for survey, forestland record management and strengthening forestland litigation resolution C 3.3 Project management, monitoring, logistics and maintenance	1. Effective forest conservation **(+++)** 2. Reduction in deforestation **(+++)** 3. Reduction in forest degradation **(+++)** 4. Effective banning of encroachment **(+++)** 5. Biodiversity conservation in the existing forests**(+++)** 6. Carbon stock conservation **(+++)**	1. Sustained access to economically beneficial NTFPs due to forest protection 2. Employment and income generation from tourism and NTFPs 3.Empowerment of local communities in protection and management of forest land	1. Clear tenurial rights to local communities. 2. Sustained access to forest products and services to local communities. 3. Power to forest departments to enforce laws and acts.	1. There will be indirect promotion of climate resilience through forest conservation leading to biodiversity conservation and income from diverse NTFPs

4.3 Co-benefits of the FIP

Bangladesh FIP includes three main projects: firstly, aimed at forest restoration and reforestation in degraded forest department land, Hill tract and Sal forests. Secondly, in promoting and raising trees on private lands (marginal farm lands and homesteads) and thirdly, reducing or avoiding forest encroachment and illegal felling through secure forest land tenure and demarcation of boundaries. An assessment of co-benefits in this chapter showed that all the three projects overwhelmingly provide multiple environmental, socio-economic, institutional and climate resilience co-benefits, in addition to carbon sequestration. However, to ensure co-benefits accrue and no trade-offs occur, it is necessary to follow some basic principles in all the programmes, namely

- Ensure biodiversity conservation
- Incorporate climate resilience in all forestry practices
- Incorporate AIGAs to promote alternate livelihoods and build resilience in local communities.
- Strengthen forest department, NGOs and local communities

The Bangladesh FIP demonstrates that it is possible to synergistically generate environmental and socio-economic benefits along with carbon sequestration and conservation of existing forest carbon stocks.

Chapter 5: Collaboration among MDBs and other Partners

Bangladesh is a large developing country and it is also one of the most vulnerable countries to climate change risks. Bangladesh is one of the largest recipients of the international financial assistants from both multilateral and bilateral agencies for programmes aimed at poverty elevation, adaptation to climate change, forest sector and infrastructure development. Bangladesh also has set up coordinating agencies for managing financial support from multiple donors and aid agencies.

International Support to BFD and Forest Sector

A number of international agencies such as USAID, IUCN, JICA, DFID, GIZ, and agencies of UN Systems (FAO, UNDP, UNEP, etc.) are collaborating with the Forest Department of Bangladesh. While these agencies are providing technical assistance, Asian Development Bank and World Bank, etc. are providing investment finance for this sector. These agencies are cooperating with the Forest Department and assisting to undertake development projects to achieve internationally agreed development goals, including the Millennium Development Goals and commitments of Multilateral Environmental Agreements such as CBD, UNFCCC, UNCCD, Ramsar, etc. Two of the major projects funded/ coordinated by World Bank for the forest sector recently include CRPARP and "Strengthening Regional Cooperation for Wildlife Protection in Asia Project".

The two key initiatives aimed at coordinating support from multiple bilateral and multilateral agencies include BCCRF and CIP. To further strengthen aid coordination and help track and manage its aid flows, the Government has launched an online aid portal, the "Bangladesh Aid Information Management System".

Bangladesh Climate Change Resilient Fund

The objective of the Bangladesh Climate Change Resilience Fund (BCCRF) is to support the implementation of Bangladesh's Climate Change Strategy and Action Plan (CCSAP). The CCSAP has identified six main pillars as follows: (i) Food security, social safety and health; (ii)Comprehensive disaster management; (iii) Development of climate proof Infrastructure; (iv) Research and knowledge management; (v) Mitigation and low carbon development; and (vi) Capacity building.

BCCRF has a two-tier governance system" A Governing Council which provides overall strategic direction and guidance to BCCRF and ensures its alignment with the CCSAP. The Management Committee which is responsible for the work programme, ensuring that the BCCRF is implemented in line with the agreed implementation manual and consider grant requests submitted by various line ministries and other eligible institutions. Both the Governing Council and the Management Committee are chaired by the Government and includes representatives from line ministries, Development Partners and Civil Society.

The World Bank initially provided support to manage the BCCRF. However, this responsibility is gradually transiting to a Secretariat that will be established at the Ministry of Environment and Forests. The Secretariat will be responsible for providing support to the Governing Council and Management Committee, provide advocacy, communication and coordination support to all agencies implementing activities funded by BCCRF.

Through BCCRF, the Government of Bangladesh has demonstrated its capacity to lead and manage a functioning secretariat within MoEF. Further, BCCRF investments contribute to

climate resiliency of targeted vulnerable population. Finally, the Government of Bangladesh has demonstrated strategic leadership on national climate change policy and global climate financing.

Thus, BCCRF will facilitate implementation of FIP.

Country Investment Plan

The GoB has developed a Country Investment Plan (CIP) which aims to facilitate enhanced planning, implementation, coordination and monitoring of investments in the EFCC sectors. The CIP also aims to mobilize and target new resources where they are most needed. The CIP aims at the following:

- Provide the framework for formulating, financing and implementing EFCC projects and programmes in alignment with national priorities;
- Translate national priorities into realistic and achievable targets and objectives;
- Mobilize public and private investments on Bangladesh's environmental challenges;
- Improve GoB public finance effectiveness on environmental issues through increased coordination amongst Government agencies, Development Partners and other stakeholders such as the private sector, NGO's etc;
- Define the roles and responsibilities of actors; and provide a framework to monitor and evaluate investments with a view to improve implementation and recommend remedial measures to activities that require strengthening.

The institutional arrangements under the CIP include:

- Central and decentralized government agencies more effectively planning, coordinating and monitoring development interventions in the EFCC sectors;
- Improved legislation and law enforcement
- Enhanced development partners and other stakeholders' coordination resulting in more
  effective decision making and reducing transaction costs;
- Research and training institutions are delivering increased knowledge products for improving the EFCC sectors.

Thus, CIP already has institutional mechanisms and programmes to facilitate planning, coordination and implementation of programmes such as FIP.

Examples of support from World Bank, ADB and UN Agencies

Bangladesh has vast experience in designing, planning, implementation and monitoring of developmental programmes particularly related to climate change, forestry, biodiversity conservation and livelihood improvement. A few major programmes recently implemented by Bangladesh are presented in the following sections.

Bangladesh receives large volumes of aid from bilateral and multilateral donors, making partnerships an important priority of the government. Foreign aid commitments amounted to US$5.2 billion in FY 2015, compared to about US$5.8 billion in each of the previous two years. Approximately 70 percent of this aid was provided by multilateral donors and 30 percent from bilateral donors. During the previous strategy period, the top five donors in terms of disbursements and commitments in Bangladesh were the World Bank Group, Asian Development Bank (ADB), Islamic Development Bank, Japan, and China. Sectors with the highest levels of donor financing include energy, transport, education, and health.

World Bank Support to Bangladesh

The International Development Association (IDA) has supported Bangladesh since 1972, just after the country's independence. Since then, the World Bank through its concessional lending arm has committed nearly $26 billion in grants and interest-free credits to Bangladesh. In the recent years, Bangladesh has been among the largest recipient countries of the IDA fund; the World Bank has also been the largest external funder of Bangladesh. The World Bank has been supporting the government efforts in economic development and growth, power, infrastructure, disaster management, climate change, human and social development and poverty reduction.

The World Bank Group's Country Partnership Framework (CPF) for 2016-2020 aims to support Bangladesh to achieve its vision of reaching middle-income status by its 50th birthday in 2021. From 2016 to 2020, the World Bank Group's technical and financial assistance to Bangladesh aims to focus on (i) accelerating growth by helping to remove bottlenecks to growth and shift more financing to increase electricity supply and improve transport connectivity; (ii) foster social inclusion by building on Bangladesh's impressive gains in human and social development; and (iii) strengthen climate and environmental management with the aim to enhance Bangladesh's resilience to natural disasters, improving water and natural resource management and modernizing agriculture. The framework is anchored in the government's seventh Five Year Plan, and aligned with the World Bank Group's Systematic Country Diagnostic (SCD) for Bangladesh. IDA's portfolio in Bangladesh as of April 10, 2017 stands at $10.1 billion in 41 projects. Two major programmes recently supported by the Bank include

1. Climate Resilient Participatory Afforestation-Reforestation Program (CRPARP)
2. "Strengthening Regional Cooperation for Wildlife Protection in Asia Project"

The Bank is expected to continue to engage in joint programming, particularly by pooling financial resources in priority sectors. Programs have fostered effective multi-donor partnerships with high level of coordination, joint planning and quality assurance. Donor support through trust funds and co-financing has been instrumental in leveraging WBG resources and reflects the growing importance of partnerships in sustaining large programmes in Bangladesh. The Bank is engaged with ADB, JICA and DFID, etc. in resilience/disaster management, and economic development programmes.

Asian Development Bank

ADB is one of the major multilateral agency or Bank after the World Bank in supporting Bangladesh development and climate change programmes.

ADB is currently supporting Bangladesh in preparing their climate change road maps. The road maps seek to (i) describe the current climate change action plans in Bangladesh, and actions needed to further develop their respective action plans; (ii) identify gaps between the current and future stock of adaptation and mitigation activities and proposed measures to fill those gaps; and (iii) identify possible activities for ADB consideration in accordance with existing climate change adaptation and mitigation funding.

ADB is Supporting Implementation of Bangladesh Climate Change Strategy and Action Plan (Subproject 2). ADB approved this C-CDTA on 16 March 2009 for Supporting Implementation of the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) with a budget of $2 million. The C-CDTA is financed by ADB, on a grant basis, from the Japan Special Fund, funded by the Government of Japan. The outcome of the C-CDTA is enhanced capacity of the MoEF and other relevant ministries and line agencies for project preparation, implementation, and policy formulation in relation to BCCSAP.

ADB also funded "Bangladesh: Strategic Climate Fund–Pilot Program for Climate Resilience". After being invited by the Pilot Program for Climate Resilience (PPCR) Sub-Committee to participate in the program. Bangladesh requested funding to support its efforts to integrate climate risk and disaster resilience into core development planning and implementation.

The funds were to be used for technical assistance (TA) projects and investments to further these goals. These same issues were highlighted in Bangladesh's Strategic Program for Climate Resilience (SPCR) of November 2012, which included proposed investments consistent with the National Adaptation Programme of Action (2005), the country's Climate Change Strategy and Action Plan (2009), and ADB's country partnership strategy (2006–2010) and country operations business plan (2009–2011) for Bangladesh.

Three investment projects focused on Bangladesh's coastal zone are proposed under the SPCR:

(i) Promoting Climate-Resilient Agriculture and Food Security,
(ii) Coastal Embankments Improvement and Afforestation, and
(iii) Coastal Climate-Resilient Infrastructure Improvement.

Forestry Sector Project (1998-2004): ADB supported a comprehensive forest sector project whose objectives and components were as follows:

Objectives or Expected Outcomes: Enhancing conservation of forests in selected protected areas (e.g., national parks, wildlife sanctuaries, and watersheds); increasing overall wood production; and managing of forest resources sustainably through local community participation, institutional capacity building, and policy reform.

Components: The Project had two main components:
(a) Part A, field development activities, including (1) forestation, and (2) participatory natural forest rehabilitation and management; and
(b) Part B, support activities, infrastructure materials and equipment,

List of Projects: Approved, Recently Completed and on-going Projects

According to Bangladesh Delta Plan – 2100, some of the approved, recently completed and on-going projects related to forests, biodiversity and climate change are listed below.

- Biodiversity Conservation and Ecotourism Development in Bangladesh (July 2011 to June 2015).
- Development and Extension of Bangabandhu Sheikh Mujib Safari Park, Cox's Bazar (July 2012 to June 2015).
- Bangabandhu Sheikh Mujib Safari Park, Gazipur (2nd Phase) (March 2010 to June 2016).

- Establishment of Sheikh Russell Aviary and Ecopark at Rangunia, Chittagong (2nd Revised) (July 2010 to June 2015).
- Sundarban Environmental and Livelihoods Security (SEALS) (1st Revised)
- Community Based Adaptation to Climate Change through Coastal Afforestation in Bangladesh (July 2009 to June 2016).
- Char Development and Settlement Project-IV (FD Component) (January 2011 to December 2016).
- Climate Resilient Participatory Afforestation and Reforestation Project (CRPARP) (July 2012 to June 2016).
- Developing Carbon Sink through Reforestation in Kaptai Area (November 2012 to June 2015).
- Revegetation of Madhupur Forests through Rehabilitation of Forest Depended Local and Ethnic Communities ((Phase-2) (July 2013 to June 2015).
- Biodiversity Conservation and Increasing Ecotourism Facilities in Laldia Reserved Forest (February 2013 to June 2015).
- Reduction of Carbon Emission through Establishment of Sonaichari Botanical Garden, Bhatiary, Chittagong. (1st Revised) (July 2011 to June 2015).
- Eco-restoration of Hill Forests, Cox's Bazar (July 2012 to June 2015).
- Development of Land and Maintenance of Environmental Balance in the Char Areas of Bhandaria Upazila near Charkhali Ferrighat to Mitigate the Adverse Effects of Climate Change through Afforestation (April 2014 to June 2016).
- Establishment of Wildlife Conservation Centre in Sylhet (November 2013 to June 2016).
- Bamboo, Cane and Murta Plantation Project (2nd Phase) (1st Revised) (July 2009 to June 2014).
- Restoration and Conservation of Biodiversity in the Denuded Hills of Sitakunda, Mirsharai, Banskhali, Inani Forest Area, Barind Dhamuer Hat Sal Forest and Singra Sal Forest (July 2011 to June 2014).
- Poverty Alleviation through Social Forestry - (March 2010 to December 2013).
- Integrated Protected Area Co-Management (IPAC)-Nishorgo (July 2010 to June 2013).
- Afforestation in the Denuded Hill Areas of Chittagong North Forest Division (2nd Phase) (1st Revised) (July 2008 to June 2013).
- Biodiversity Conservation and Poverty Alleviation in the Greater Rajshahi and Kushtia Districts (July 2008 to June 2013).
- Forest Information Generation and Networking System Project (January 2011 to March 2013).
- Coastal Charland Afforestation Project (2005-06 to 2009-10).
- Establishment of Botanical Garden and Eco-park at Sitakunda, Chittagong (2005-06 to 2009-10).
- Management Support Project for Sundarban Reserved Forest (2005-06 to 2009-2010).
- Initiation Phase of the Shamol Bangladesh: Greening Initiative for Sustainable of Rural Poor and Biodiversity Conservation Project.
- Forestry Sector Project (1997-98 to 2005-06).
- Development of Kaptai National Park (1999-2000 to 2005-06).
- Strengthening Capacity to Generate Quality Information on Forest Resource (2004-05 to 2006-07).

Collaboration among MDBs and other Partners

Bangladesh has vast experience in implementing externally aided projects, Bangladesh also has adequate institutional arrangements to coordinate, plan, implement and monitor developmental projects in the environment, forests and climate change sectors. Bangladesh has BCCRF as an umbrella organization to coordinate funding from multiple agencies. The CIP of Bangladesh also provides Framework for implementation and monitoring of forest and climate change projects. World Bank has a large "Sustainable Forests and Livelihood" project in the pipeline. Thus, FIP will be adequately coordinated and supported by multiple multilateral and bilateral agencies. FIP will explore multiple bilateral and multilateral sources of funding for FIP.

Chapter 6: Identification and Rationale for Projects to be Co-financed by FIP

6.1 Introduction

Bangladesh has very limited area under forests and even this limited area under forests is subjected to deforestation and degradation. Chapter 1 presented the rates of deforestation and degradation of forests. The forest sector is facing many challenges and increased pressure on forest resources. Bangladesh government wants to address some of the challenges facing forest sector through FIP. The main aim of the Draft National Forest Policy is to manage all existing forests, wildlife and other forestry resources, adhering to the principles of sustainable management and climate resilience; enrich degraded forest areas; and enhance land areas under forest/tree cover; produce a wide array of goods and ecosystem services for the benefit of Bangladesh's present and future generations. The National Forest Policy (Final Draft) has given adequate consideration for the climate resilient forestry, ecological restoration for increasing carbon sequestration, periodic assessment of carbon stocks and formulation of forest carbon financing proposals with an emphasis on the use of REDD+ activities as potential sources of the generation and sharing of benefits between public forestry sector organizations and local communities. Updated Forestry Master Plan of Bangladesh (2017-2036) has reviewed the salient features of the draft forestry policy 2016 and noted that the policy has adequate consideration to create massive carbon sinks for carbon sequestration by bringing more areas under tree cover. Further, the policy also aims to develop and implement awareness raising strategies and capacity development programmes on the opportunities for adaptation and mitigation measures as per the climate change action plan. The policy gives adequate importance to significantly increase tree cover outside state forests, through appropriate mechanisms, in both public and private land including urban areas. The 7th Five Year Plan (2016-2020) and The Bangladesh Country Investment Plan (CIP) for Environment, Forestry and Climate Change for 2016-2021 suggested to initiate Carbon Credit and REDD program in Bangladesh, to enable substantial forest restoration and coastal afforestation through partnerships with local communities, civil society and private sector.

In this chapter, the aim is to transform the forest sector through a set of forest investment projects. The chapter provides the rationale for selecting the projects, the challenges addressed, the components and activities of the projects, the region or locations for project implementation, and a tentative budget for each project.

6.2 Main Constraints and Potential Response Measures

The forest sector of Bangladesh faces many challenges. Limited area under forests (17.62%), prevalence of deforestation or conversion of forest land to non-forestry purposes and forest degradation due to over-exploitation of tree resources are the three main challenges faced by the forest sector in the country. The drivers of deforestation and forest degradation are presented in detail in Chapter 1. A summary of key challenges and potential responses to address the challenges are presented in Table 6.1.

Forest sector in Bangladesh is characterized by very limited area under forests, high population pressure on land and density of 976 person per Sq./km (as on 2011), growing demand for land for settlement and infrastructure and for expansion for agriculture, increase in demand for fuelwood, timber and industrial wood due to population and economic growth. These challenges are further aggravated by low investment, inadequate capacity,

infrastructure and facilities within BFD. The successive Five Year plans have recognized these limitations.

The Forest Policy of 1994, the Draft National Forestry Policy of 2016 and the ongoing 7th Five Year Plan have set a goal to achieve a tree cover of 20% of geographic area, conservation of all existing natural forests and promotion of A&R in public and private lands. But, these goals have not been backed up by adequate investment. Infact, the CIP has set a goal of investing USD 11.7 billion for the forest sector, where the analysis suggests a funding gap of about US$7 billion for the next five years, (2016 – 2021), which is 60 percent of the total CIP costs.

Thus, there is a need to develop a set of forest investment projects, implement and monitor them. Table 6.1 also provides a set of responses to address the challenges and their linkage with the FIP. The main constraints and the drivers of deforestation and forest degradation are presented in Figure 6.1.

Table 6.1: Key challenges faced by the forest sector in Bangladesh and the potential responses

Challenges faced by the forest sector	***Potential Responses***
Low area under forest, Limited area under forests and area under natural forests, outside Sundarbans, due to high population density. Pressure on forest land for many purposes leading to illegal encroachment and official conversion of forest land to commercial land.	1. Bangladesh has realized the importance of the forest sector and the 7th Five Year Plan has a goal to "achieve tree cover of 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)". 2. This requires conserving all the existing natural forests and plantations in forest land and undertaking forest restoration and A&R. 3. The proposed FIP project 3 aims at conserving the forests by demarcation and secure land tenures. 4. FIP projects 1 & 2 aims at expanding the forest area through A&R in forest lands, public lands and private lands.
Over-exploitation of the forest resources, large scale illicit removal of timber and other forest resources, leading to degradation of particularly natural forests, especially in hill forests	1. 7th Five Year Plan as well as the CIP of Bangladesh highlight the need for restoration and regeneration of Sal and Hill Tract forests. 2. FIP project 1 has a specific component aimed at conservation and restoration of hill forests.
Increase in demand for fuelwood, timber and industrial wood, leading to imbalance between demand and supply for fuelwood, timber and industrial wood	1. Given the limited forest land or public land, 7th Five Year Plan and CIP aims at promoting private forests, agroforestry, homestead gardens, institutional, social forestry, and plantations on marginal lands. 2. FIP project 2 particularly aims at promoting forestry on private lands to meet the growing biomass demands.

Low investment in forest sector and inadequate financing.	1. The CIP aims at an allocation of USD 2.46 billion for the forest and NRM sectors, leading to enhanced tree cover by 2.84 million ha by 2021. 2. The FIP projects 1 and 2 aim at significant increase in the investment in forest sector for expanding the forest area and carbon stocks as well as strengthen and build capacity of BFD.
Inadequate staff in the BFD and inadequate training. Inadequate infrastructure, legal support for enforcing forest laws and for undertaking conservation and afforestation	1. All the policies and programmes presented in Chapter 2 highlight the need for strengthening the forest department, building capacity of the staff of the BFD and to improve the infrastructure and logistic support to the forest sector. 2. All the FIP projects have a dedicated component aimed at strengthening BFD staff and improved forest management and monitoring including logistics.

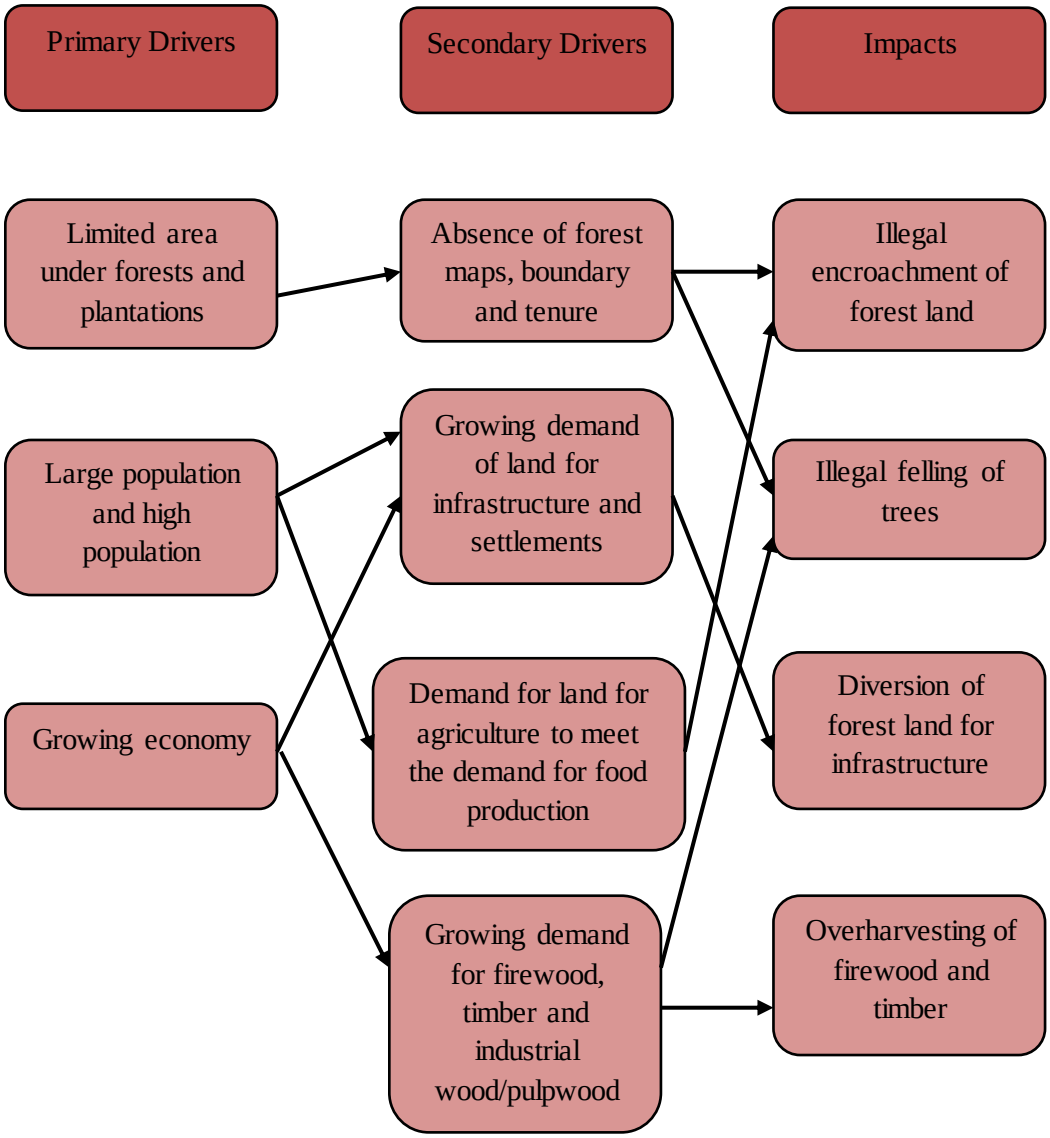


Figure 6.1: Drivers of deforestation and forest degradation (Based on Chapter 1)

6.3 Transformational Objective of FIP

From the Forest Policy of 1994 to the 7th Five Year Plan, Bangladesh forest sector had a goal to increase the forest cover upto 20% by 2020 and to conserve all the existing natural forests and biodiversity. However, deforestation and forest degradation continues due to various factors explained in Section 6.1 and Chapter 1. Thus, there is a need for transformational change in forest sector to save the very limited area under natural forests and to expand the forest area to meet the growing biomass needs for economic development. The transformational goal proposed in this FIP is as follows:

"To conserve the existing forests and reduce emissions from deforestation and forest degradation, to contribute to expansion of the forest cover towards the goal of 20% of the geographic area, mainly through climate resilient forest restoration, A&R and planting TOF, to conserve and restore forests and to enhance forest carbon sink and diversify and improve the livelihoods of forest dependent communities, to meet the growing needs of biomass, through increased investment, strengthened forest department, local institutions and community participation"

The FIP has 3 broad transformational objectives linked to achieve the transformational goal set for the sector and to meet the targets set out in the 7th Five Year Plan, CIP, draft National Forest Policy and FMP. The broad transformational objectives are presented in the Figure 6.2 and Table 6.2.

Table 6.2: Three FIP projects to promote forest sector transformational goal for Bangladesh

1	*To promote* "Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests"
2	*To promote* "Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink"
3	"Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plain land Sal forest"

A World Bank supported project titled "Bangladesh; Sustainable Forests and Livelihoods" (SUFAL) with a budget of US$ 175 million is also under preparation. The main Objective of the SUFAL project is to improve collaborative forest management and increase access to alternative income generation activities for forest-dependent people in targeted areas.

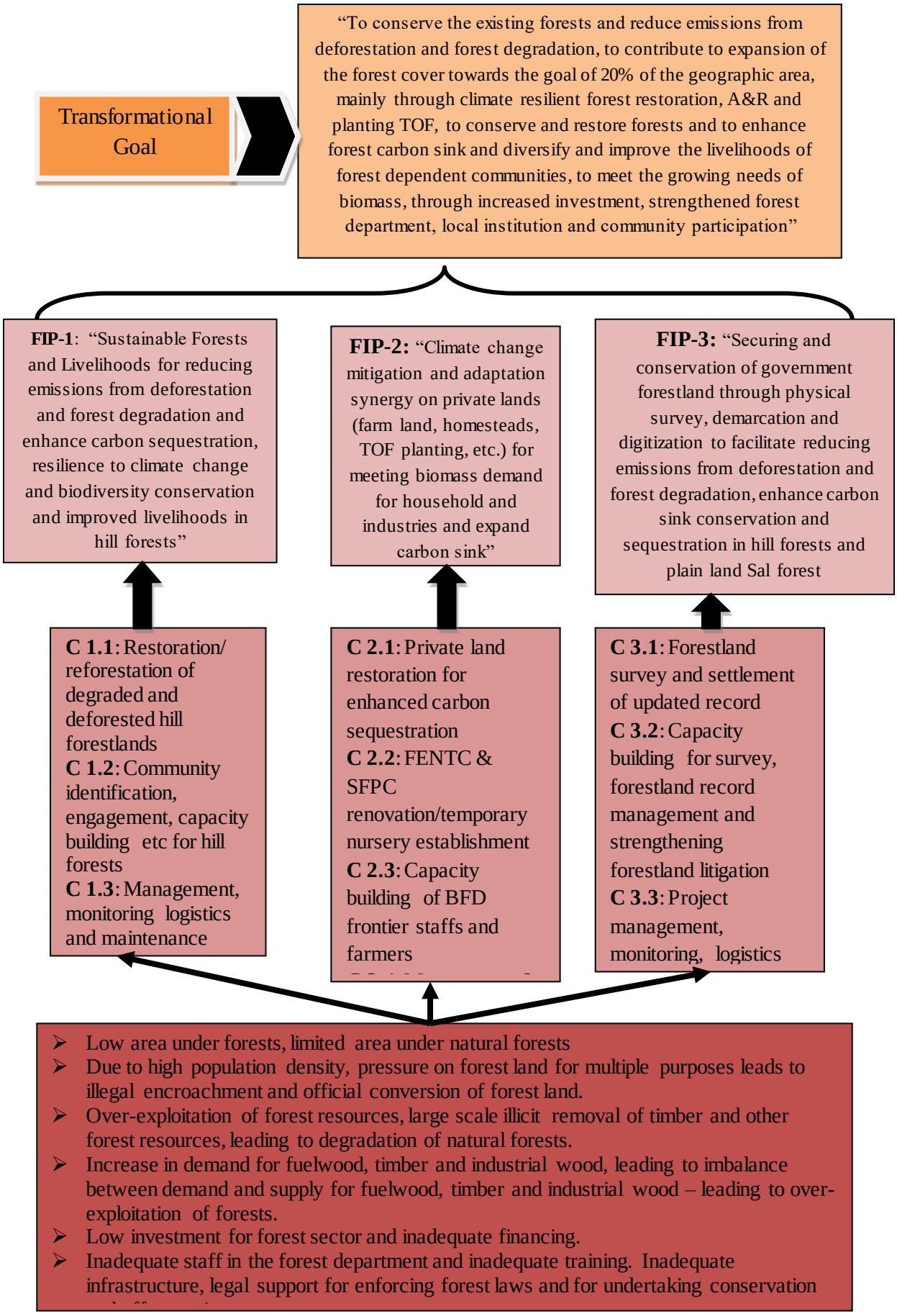


Figure 6.2: The broad transformational goals and objectives of forest sector

6.4 Forest Investment Project: FIP - 1: Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests

6.4.1 Rationale of the Project

Forest degradation and deforestation has been a common feature of hill forests and plain land Sal forests in Bangladesh. Forest degradation and fragmentation, predominantly due to socioeconomic pressures in the case of Bangladesh, results in forests being more vulnerable to current climate risks and long-term climate change vulnerability. By assessing the current or inherent vulnerability of forests to the risks of current climate change, adaptation strategies can be designed to tackle the sources of vulnerability, in order to reduce the vulnerability of forests to future climate change. By identifying and prioritizing the most vulnerable forests, policy makers and forest managers can prioritize and develop adaptation interventions that will enhance the resilience of forests to climate change by restoring their health, vigor and productivity. This is particularly essential for the poor communities who depend on forest ecosystems and its services for their livelihoods. It has been reported that jobs and livelihoods of nearly 10 million people in Bangladesh are dependent on the forest products, and forest product-based industries and occupations.

Sustainable forest management and improved livelihoods through large scale forest restoration and afforestation is an integral component of forest and biodiversity conservation and climate change mitigation and adaptation strategies in the forestry sector. This will contribute towards reducing emissions from deforestation and forest degradation

6.4.2 Challenges addressed

Forestry sector has chronically suffered from acute shortage of tree cover. Deforestation and forest degradation are the major challenges facing the sector. Restoration of the tree cover in Bangladesh requires a two-pronged strategy: a massive reforestation drive (FIP-1) for the degraded and deforested state forests and even bigger thrust to encourage tree planting outside the forests (FIP-2) through extension and marketing support to the members of the public. Both these strategies have not made any significant headway in the past due to an acute shortage of funding and absence of community participation including governance mechanisms of local institutions. Finding adequate funds for afforestation/reforestation, forest restoration and organisational capacity and desired governance mechanism of local institution including community participation with incentive mechanisms to support these strategies is the key challenge for the forestry sector.

National policy instruments are emphasizing sustainable forest management practices that contributes towards reducing emissions from deforestation and forest degradation, enrich carbon sink, improve climate change resilience and ecosystem services, benefiting forest dependent communities and people at large. Further, promotion of sustainable forest management would also lead to promote carbon sequestration, biodiversity conservation and enhanced climate change resilience through restoration /reforestation /afforestation in degraded and deforested forestland: hill forests, and plain land Sal forests.

6.4.3 Transformational Objective of the Project

The transformational objective of the project aims to restore degraded forest ecosystems and conserve biodiversity through sustainable forest management practices for enhancing carbon

sequestration, ecosystem services, livelihoods opportunities, and climate change resilience. It also promotes sustainable forests and livelihoods through restoration of degraded and deforested areas and expansion of area under different forests, leading to conservation of biodiversity and ultimately contributing to increase in carbon stocks in forests synergistically with other economic and conservation objectives for the forest sector, such as promotion of livelihoods of forest dependent communities.

Specific objectives of this project are as follows:

- To restore and regenerate degraded and deforested forestlands with resilient species and enhance management efforts in developing multi-storied forests to maximize carbon sequestration in forestlands
- To enhance carbon sequestration, climate change resilience and biodiversity conservation in forest ecosystems, through forest restoration and afforestation/ reforestation.
- To engage communities in sustainable forest management and biodiversity conservation through alternate income generation activities and education.

6.4.4 Linkage with Developmental Plans and Programmes

This project contributes to meeting the goals of 7th Five Year Plan regarding expansion of forest area, restoration and sustainable management of Sal and hill forest. This project is also consistent with the proposed programmes under CIP such as expansion of A&R in plains and hill lands, co-management of forests and increased resilience to climate change. This project has direct linkage to the UN REDD Program now ongoing for the preparation of REDD Strategy for Bangladesh.

This project is designed based on the draft Final Bangladesh Forestry Master Plan (2017-2036) which has mentioned that all existing forest, wildlife and other forestry resources have to be managed, adhering to the principles of sustainable management and climate resilience; enrich degraded forest areas; and enhance land areas under forest/tree cover; to produce a wide array of goods and ecosystem services for the benefit of Bangladesh's present and future generations.

According to the 7th Five Year Plan, 20 percent productive forest cover is targeted for 2020 to achieve environmental sustainability in Bangladesh. This project is going to restore 52,600 ha of degraded and deforested lands. This project will focus on hill forests.

6.4.5 Broad implementation area/region/zone of Project: FIP-1

The project is proposed to be implemented in Hill Forests Covering 10 F. Divisions.

6.4.6 Transformational Change from Project: FIP-1

The transformational change that will result from the project include "Restoration of degraded forest ecosystems and conservation of biodiversity through sustainable forest management practices for reducing emissions from deforestation and forest degradation, enhancing carbon sequestration, ecosystem services, livelihoods opportunities, and climate change resilience". This project will regenerate 52,600 ha of deforested and degraded lands contributing to the main goals of the forest sector to conserve and enhance forest cover in the hill forest divisions. The project will also contribute to broader goals of the sector including biodiversity conservation, carbon sequestration, and enhancing resilience to climate change.

The project will also aim at building community co-management institutions including incentive mechanism and development of alternate livelihood activities for 15000 households to promote forest conservation and sustainable management. Project will improve organizational capacity of BFD and its monitoring mechanism. Relevant officials/staffs will be trained on contemporary issues and topics for building their competencies in managing REDD issues, climate change mitigation and adaptation within Forest Sector of Bangladesh. The transformational objective, project components and locations of project 1 are represented in Figure 6.3. The BFD staff strength will be enhanced, along with capacity building activities on issues such as SFM, carbon sequestration, climate resilience and ecosystem services.

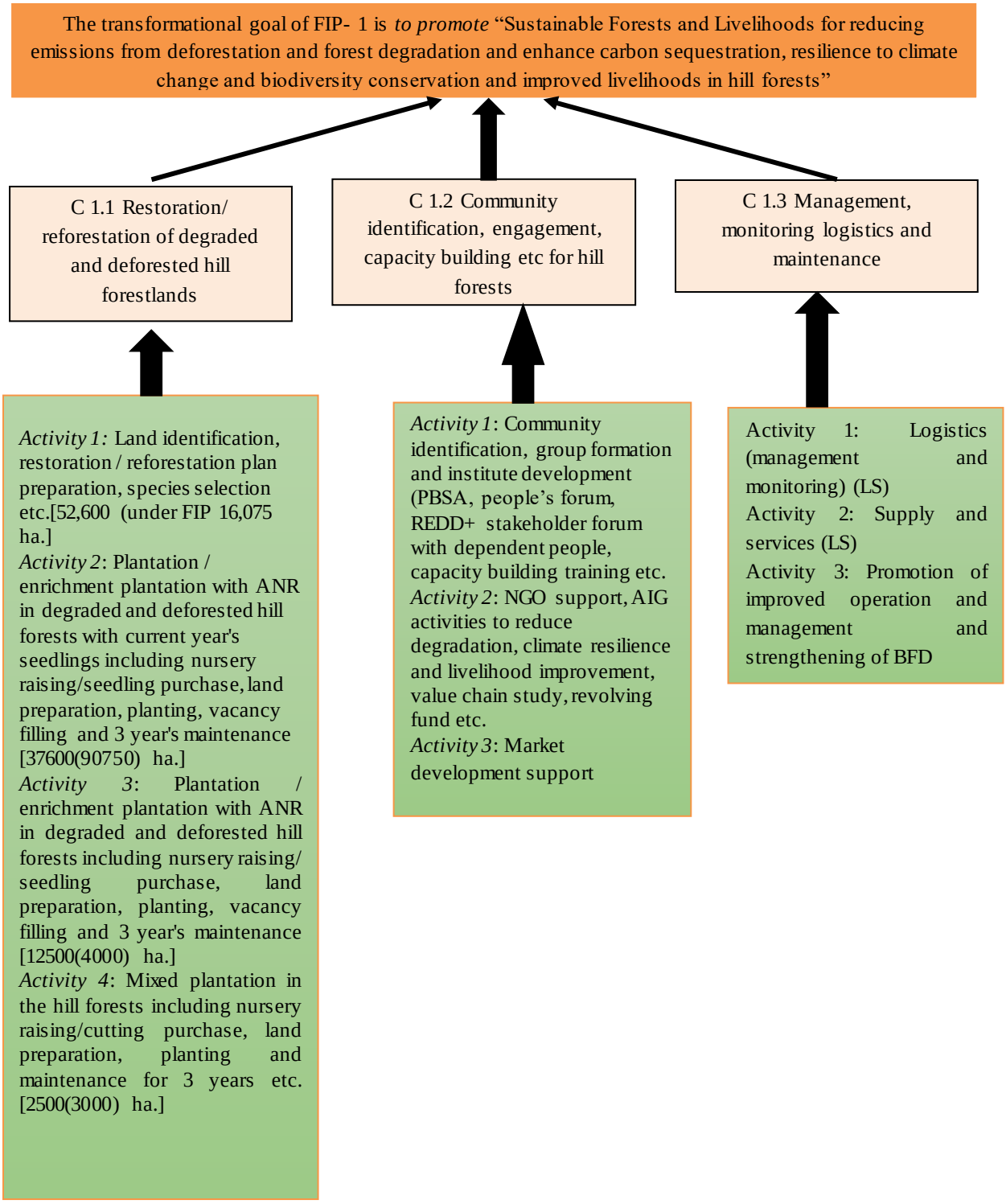


Figure 6.3: FIP 1: Transformational objective, project components and activities of Project FIP-1

6.4.7 Components of Project: FIP-1

The FIP 1 has three components which include restoration of degraded and deforested forestland, community identification, capacity building, improved management, monitoring and logistics.

6.4.7.1 Component – 1.1: Restoration/ reforestation of degraded and deforested hill forestlands

Objective of Component 1.1: The main goal of this project is to reduce emissions from deforestation and forest degradation, enhance carbon sequestration, biodiversity conservation and climate change resilience through restoration /reforestation/afforestation in the degraded and deforested forestland: hill forests, plain land Sal forests, by adopting SFM practices.

Activities: The activities of the component are as follows:

Activity 1: Land identification, restoration / reforestation plan preparation, species selection etc.[52,600 (under FIP 16,075 ha.]

Activity 2: Plantation / enrichment plantation with ANR in degraded and deforested hill forests with current year's seedlings including nursery raising/seedling purchase, land preparation, planting, vacancy filling and 3 year's maintenance [37600(90750) ha.]

Activity 3: Plantation / enrichment plantation with ANR in degraded and deforested hill forests including nursery raising/ seedling purchase, land preparation, planting, vacancy filling and 3 year's maintenance [12500(4000) ha.]

Activity 4: Mixed plantation in the hill forests including nursery raising/cutting purchase, land preparation, planting and maintenance for 3 years etc. [2500(3000) ha.]

6.4.7.2 Component – 1.2: Community identification, engagement, capacity building etc for hill forests

Bangladesh has vast experience in community engagement in forest management through social forestry. CRPARP project also had components aimed at building capacity of the communities and community level institutions and also promoting alternating livelihood income generation activities to reduce pressure on forests and to promote livelihoods. Community empowerment, engagement and participation incentive mechanism is critical for any forest restoration activity.

Objective of Component 1.2: The main objective of this component is to strengthen local communities and institutions through community identification, group formation and supporting AIG activities and market development.

Activities: The activities of the component are as follows:

Activity 1: Community identification, group formation and institute development (PBSA, people's forum, REDD+ stakeholder forum with dependent people, capacity building training etc.

Activity 2: NGO support, AIG activities to reduce degradation, climate resilience and livelihood improvement, value chain study, revolving fund etc.

Activity 3: Market development support

6.4.7.3 Component – 1.3: Management, monitoring logistics and maintenance

Objective of Component 1.3: The main objective of this component is to strengthen BFD, improve operation and management in terms of logistic, supply and services, operation,

improved forest management for reducing pressure on deforestation and enhancing carbon sequestration.

Activities: The activities of the component are as follows:

Activity 1: Logistics (management and monitoring) (LS)

Activity 2: Supply and services (LS)

Activity 3: Promotion of improved operation and management and strengthening of BFD

6.4.8 Budget of Project: FIP-1

The budget for the three components and activities under FIP-1 are given in Table 6.3. This project involves high investment for restoration/ reforestation of degraded and deforested hill forestlands costing around USD 57 million, out of which USD 17.7 million is targeted under FIP.

Table 6.3: Budget for Project FIP-1: Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests

Project	Components	Total Budget (In Million US$)	FIP Component of the Budget (In Million USD)
Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance carbon sequestration, resilience to climate change and biodiversity conservation and improved livelihoods in hill forests	1.1 Restoration/ reforestation of degraded and deforested hill forestlands	57.561	17.742
	1.2 Community identification, engagement, capacity building etc. for hill forests	16.641	5.883
	1.3 Management, monitoring logistics and maintenance	2.750	1.375
Total		**76.952**	**25.000**

6.5 Forest Investment Project (FIP-2): Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink

6.5.1 Rationale of the Project

TOF (Trees Outside Forests) dominates the forest types in Bangladesh, accounting for 1.7 million ha. 88.4% of the total 28.7 million Households (HHs) are in rural areas. Over 70% of the total forest products (such as fuelwood and timber) are supplied from TOF area. Rural HHs possess high potential to enhance vegetative cover and thereby enhance the carbon sequestration, along with enhanced supply of forest products. TOF is a high potential area for carbon sequestration through extension forestry. Improved livelihoods through large scale tree planting in farms and homesteads along with capacity building of forest department and the stakeholders are critical components of climate change mitigation and adaptation strategies.

6.5.2 Challenges Addressed

The biggest challenge facing the sector is to reduce deforestation and forest degradation at the same time meet the growing biomass demands of the country. Population pressure, forest land use conversion for agriculture, deforestation and over exploitation of forests, etc. are important drivers of forest degradation and deforestation. The project will reduce pressure of the growing demand for fuelwood, timber and industrial wood drivers of forest degradation and deforestation. This project will improve capacity of forest department and private sectors at local level to improve tree cover in all the unions/ upazila and establish a mechanism of sustainable management of the vegetative cover of the households for enhanced ecosystem services at local level.

This project is designed to improve the vegetative cover in the private lands, TOFs and improve nursery infrastructure at local level and capacities of forest department and farmers to ensure supply of quality planting materials, for planting in the farm lands, homesteads and marginal lands in the country. Such an arrangement will not only increase tree cover and sequester carbon in the farm lands, homesteads and marginal lands and also enhance supply of timber and fuelwood and reduce pressure of deforestation and forest degradation in the public lands/forest lands.

6.5.3 Transformational Objective of the Project: FIP-2

The transformation objective of FIP-2 is to achieve climate change mitigation and adaptation synergistically with meeting the biomass needs of the country through forest interventions in farm lands, homestead and marginal lands.

This Project aims to promote climate change mitigation and adaptation synergy on private lands as has been envisaged in the new FMP. Planting program on TOF areas will enhance the capacity of the country as a whole in meeting the biomass demands for household and industries.

Specific objectives of FIP-2 are as follows:

- To introduce climate change mitigation and adaptation synergy on private lands by planting trees on farm lands, homesteads and marginal lands, at local level
- Coastal green belt (non-mangrove) plantation on government (non-forest) and private land.
- To improve sources of planting materials at local market.

- To improve organizational capacity and infrastructural development of social forestry wing of forest department at local level.

6.5.4 Linkage with Developmental Plans and Programmes

Planting trees on farm lands, homesteads, and marginal lands is proposed for implementation under the 7th Five Year Plan (2016-2020) period. Credit programme has been recommended for the improvement of fruit tree planting on private lands. It has been reported in the draft Bangladesh Forestry Master Plan (2017- 2036) and in the 7th Five Year Plan (2016-2020) that trees outside forests contribute billions of dollars to the national economy in the form of timber, fuelwood, ecosystem goods and services.

6.5.5 Broad Implementation Area/Region/Zone of Project – 2

FIP-2 is proposed to be implemented in parts of Total 20 F. Divisions

6.5.6 Transformational Change from Project: FIP-2

The transformational change from FIP-2 is aimed at climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and to expand carbon sink. The project aims at improving nursery infrastructure at FENTC/SFPC and enhanced capacity of Forest Department officials in forestry extension activities, sustained supply of improved planting materials through capacity building of farmers and ensuring that farmers (private nursery owners) acting as extension agents of BFD. A 500-meter-wide costal green belt is proposed to be created using private land in costal districts of Bangladesh to promote mitigation and adaptation. The Transformational objective, project components and locations of Project 2 are represented in Figure 6.4.

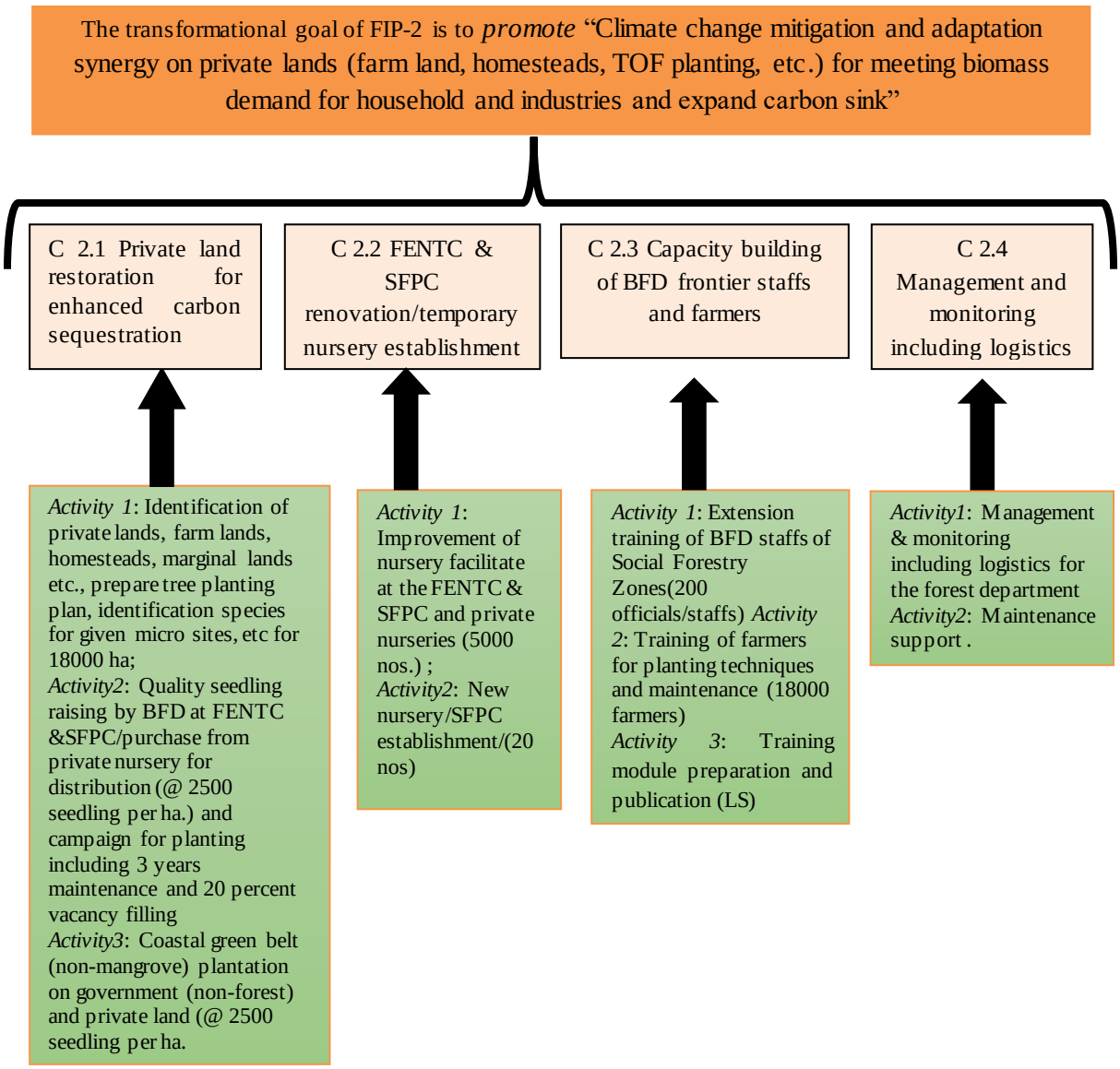


Figure 6.4: FIP 2: Transformational objective, project components and activities of Project 2

6.5.7 Components of Project: FIP-2

FIP-2 includes four components involving tree planting on private lands, renovation of FENTC/SFPC, new nursery establishment, capacity building of BFD staff and farmers, improved management and monitoring.

6.5.7.1 *Component 2.1: Private land restoration for enhanced carbon sequestration*

Objective of Component 2.1: The main objective of the component is to expand tree resources horizontally and vertically (multi-storied) in farm lands, homesteads and marginal land to increase tree cover and green belt, and to meet the demand for timber, fuelwood and other forest products.

Activities: The activities of the component are as follows:

Activity 1: Identification of farm lands, homesteads, marginal lands etc., prepare restoration plans including GIS map and identify species etc.[18000 (18000)ha.]

Activity 2: Quality seedling raising by BFD at FENTC &SFPC/purchase from private nursery for distribution (@ 2500 seedling per ha.) and campaign for planting including 3 years maintenance and 20 percent vacancy filling of 10000 ha.
Activity3: Coastal green belt (non-mangrove) plantation on government (non-forest) and private land (@ 2500 seedling per ha. for 8000 ha.

Broad region / project location: This component will be implemented in Total of 20 F. Divisions:

6.5.7.2 Component 2.2: FENTC & SFPC renovation/temporary nursery establishment

Objective of Component 2.2: The main objective of the component is to improve nursery facilities at FENTC/SFPC to ensure supply of quality planting materials for planting in the farm lands, homesteads and in the marginal land through campaign to meet the demand for timber, fuelwood and other tree resources.

Activities: The activities of the component are as follows:
Activity 1: Improvement of nursery facilities at the FENTC & SFPC (50 nos.)
Activity2: New nursery/SFPC establishment (20 Nos.)

Broad region / project location: This component will be implemented in 13 S.F Divisions:

6.5.7.3 Component 2.3: Capacity building of BFD frontier staffs and farmers

Objective of Component 2.3: The main objective of the component is to increase skills of BFD officials for promoting forestry extension program to support tree planting on private lands.

Activities: The activities of the component are as follows:
Activity 1: Extension training of BFD staffs of Social Forestry Zones (200 officials)
Activity 2: Training of farmers for planting techniques and maintenance (18000 farmers)
Activity 3: Training module preparation and publication (LS)

6.5.7.4 Component 2.4: Management and monitoring including logistics

Objective of Component 2.4: The main objective of the component is to strengthen forest administration to reach the farmers, to strengthen extension services at the local level. This component also aims to assist in providing logistic support and facilitation of forest department and its nursery facilities

Activities: The activities of the component are as follows:
Activity1: Management and monitoring including logistics (for 20 Forest Divisions)
Activity2: Maintenance (20 Forest Divisions)

6.5.8 Budget of Project: FIP-2

The budget for the four components and activities under FIP 2 are given in Table 6.4. This project involves major investment for private land restoration for enhanced carbon sequestration, costing around USD 19.350 million.

Table 6.4: Budget for FIP-2: Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink

Project	Components	Total (In Million US$)	FIP Component of the Budget (In Million USD)
Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink	2.1.1 Private land restoration for enhanced carbon sequestration	19.350	19.350
	2.1.2 FENTC & SFPC renovation/temporary nursery establishment	0.813	0.813
	2.1.3 Capacity building of BFD frontier staffs and farmers	1.038	1.038
	2.1.4 Management & monitoring including logistics	3.800	3.800
Total		**25.001**	**25.001**

6.6 Forest Investment Project FIP-3: Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plain land Sal forest

6.6.1 Rationale of the FIP-3

The UN-REDD Bangladesh National Programme has conducted a study on drivers of deforestation and forest degradation in Bangladesh in 2017 and it concluded that absence of forest land survey records and boundary demarcation is one of the major direct drivers of deforestation and degradation in Bangladesh. At present, there is no clear physical boundary for most of the forestlands. The land records are officially kept and maintained by the DLRS. These do not corroborate with the land records kept and maintained by the BFD. This is the key to trigger land suit litigations with respect to BFD land. Updating of land records and both BFD & DLRS having the same records is the only solution towards reducing emissions from deforestation and forest degradation.

6.6.2 Challenges Addressed Under FIP-3

Confusion in land tenure, duel administration/ multiple claims on proprietary rights of forest lands, encroachments and weak enforcement of forest land administration are important drivers of deforestation and forest degradation in Bangladesh. Forest land boundary demarcation has become essential to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plainland Sal forest. This effort will secure land tenures, improve forest law enforcement and reduce pressure on forest land encroachment hence, contribute towards enhancing carbon sequestration in the country. Forestland boundary demarcation, digitization and public access

to forest land records will improve enforcement of forest law, clarify forest land tenure and strengthen governance structure of forest land management in the country. Murky tenure issues (e.g. encroachment, the existence of multiple claims over BFD land, and insecure land ownership) hinder investments in forests and provide disincentives for the sustainable management of forest lands in Bangladesh.

6.6.3 Transformational Objective of FIP-3

Conservation of existing natural forests and government forest land through secure land tenure, forest boundary demarcation, digitization of the forest maps and the use of ICT to strengthen the forest department. The project aims to strengthen forest law enforcement by surveying and demarcating forestland boundary, resolve forestland dispute/ tenure, enhance governance and update forest land records.

6.6.4 Linkage with Developmental Plans and Programmes

The 7th Five Year Plan (2016-2020) has explicitly suggested for forestland boundary demarcation and recommended to take measures for updating forest land records. CIP has also identified it as one of the sub-programmes "Updating the land records and demarcation of forest area and improve security of land tenure, demarcation of forest areas to prevent encroachments". Lack of clear boundary of forest land is a challenge identified in the Draft Bangladesh Forestry Master Plan (2017-2036) and Draft Forest Policy (2016) and both suggested for the demarcation of forestland boundary. Thus, this project is consistent with the challenges identified by the 7th Five Year Plan, CIP, Draft National Forest Policy and FMP and also by the stakeholders thus contribute towards reducing emissions from deforestation and forest degradation.

6.6.5 Broad Implementation Area/Region/Zone of FIP-3

The project is proposed to be implemented selected locations of hill forest and Sal forest divisions.

6.6.6 Transformational Change from FIP-3

Completion of this project will bring a transformational change in forest conservation and management leading to resolving of land litigation and rights claimed illegally and thus contribute towards reducing emissions from deforestation and forest degradation. By and large forest law enforcement will get enhanced. The clear physical demarcation of the forest boundary will reduce pressure of deforestation and forest degradation in public (BFD) lands of three selected forest divisions. The Transformational objective, project components and locations of FIP-3 are represented in Figure 6.5

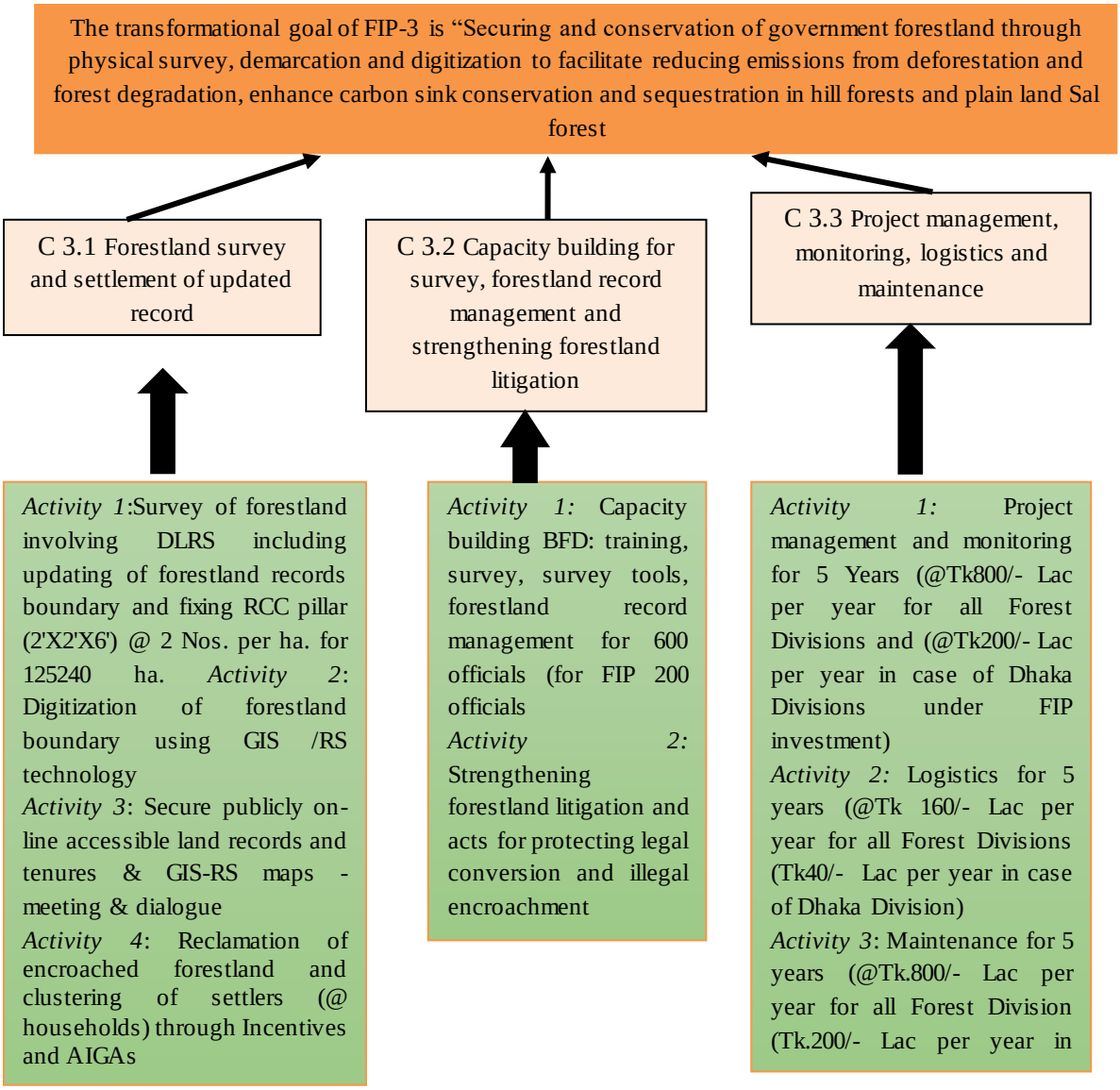


Figure 6.5: FIP 3: Transformational objective, project components and activities of Project FIP-3

6.6.7 Components of FIP-3

FIP-3 has three components which include secure land tenure, forest boundary demarcation and digitization of forest land records, capacity building, project management and monitoring, logistics and maintenance.

.

6.6.7.1 Component 3.1: Forestland survey and settlement of updated record

Objective of Component 3.1: This component aims to secure forest land tenure and settlement of updated records by surveying forestland boundary involving Land Record and Survey Department (DLRS) and demarcating boundary by fixing RCC pillars. It is also proposed to conduct digitization of forestland boundary maps using GIS /RS technology in the forest area. Secure publicly on-line accessible land records and tenures and GIS-RS maps.

Reclamation of encroached forestland and clustering of settlers through incentives and AIGAs.

Activities: The main activity of this component is aimed at Physical survey and demarcation of forestland boundary and digitization of forest area. The following activities are proposed under this component.

Activity 1: Survey of forestland involving DLRS including updating of forestland records boundary and fixing RCC pillar (2'X2'X6') @ 2 Nos. per ha for 125240 ha.

Activity 2: Digitization of forestland boundary maps using GIS /RS technology in the forest area

Activity 3: Secure publicly on-line accessible land records and tenures & GIS-RS maps

Activity 4: Reclamation of encroached forestland and clustering of settlers through Incentives and AIGAs

6.6.7.2 Component 3.2: Capacity building for survey, forestland record management and strengthening forestland litigation

Objective of Component 3.2: The main objective of the component is to increase capacity of Bangladesh Forest Department officials through skill development training in forestland and digital survey, mapping, record keeping and archiving, demarcation and digitization, updating of land settlement records and reclamation of encroached lands. This component is proposed for strengthening forestland litigation and acts for protecting from illegal conversion and encroachment.

Activities: The activities of the component are as follows:

Activity 1: Capacity building BFD: Training on survey tools, forestland record management for 600 officials (200 officials (@BDT0.50 per officials)

Activity 2: Strengthening forestland litigation and acts for protecting from illegal conversion and illegal encroachment

6.6.7.3 Component 3.3: Project management, monitoring, logistics and maintenance

Objective of Component 3.3: The main aim is to ensure effective project management, monitoring, logistics and maintenance of forestland records. This will include establishment of Project Management Unit (PMU), planning, implementation and monitoring. This component is critical, given the limited staff and capacity of the BFD. Further, the PMU will coordinate all the activities and involve institutions to conduct activities relevant to this component. This component would require coordination of activities such as involvement of agencies related to remote sensing, GIS and digitization of the land survey and maps.

Activities: The activities of this component are as follows:

Activity 1: Project management and monitoring for 5 Years (@Tk800/- Lac per year for all Forest Divisions and (@Tk200/- Lac per year in case of Dhaka Divisions.

Activity 2: Logistics for 5 years (@Tk 160/- Lac per year for all Forest Divisions (Tk40/- Lac per year in case of Dhaka Division)

Activity 3: Maintenance for 5 years (@Tk.800/- Lac per year for all Forest Division (Tk.200/- Lac per year in case of Dhaka Division)

6.6.8 Budget of FIP-3

The budget for the three components and activities under FIP-3 are given in Table 6.5 This project requires high investment for survey and demarcation of forest boundary and updating of the forest land records, costing around USD 104 million.

Table 6.5: Budget for FIP-3: Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plain land Sal forest

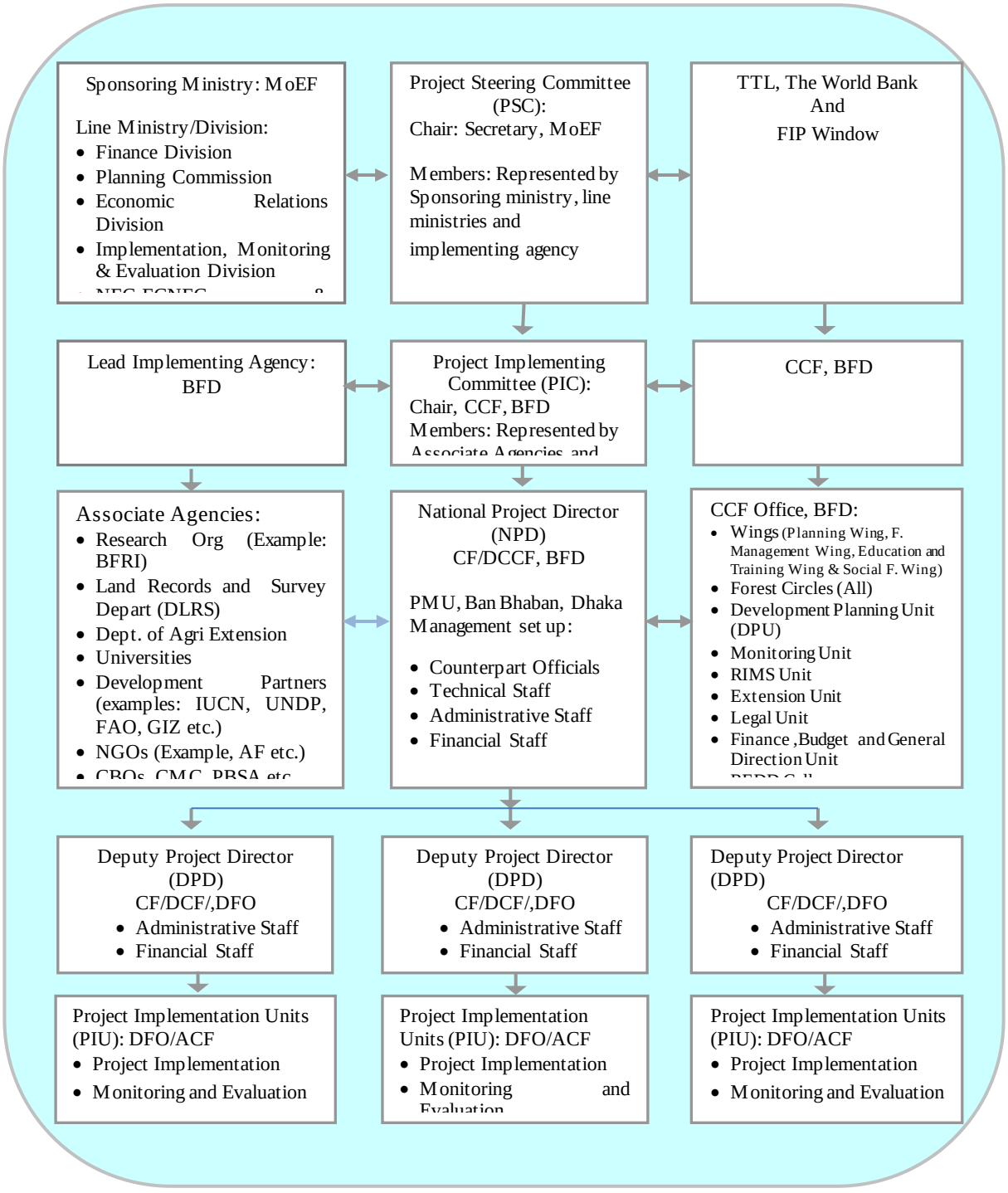
Project	Components	Total (In Million US$)	FIP Component of the Budget (In Million USD)
Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plain land Sal forest	3.1.1 Forestland survey and settlement of updated record	104.555	20.875
	3.1.2 Capacity building for survey, forestland record management and strengthening forestland litigation	1.625	1.375
	3.1.3 Project management, monitoring, logistics and maintenance	11.000	2.750
Total		**117.18**	**25.00**

Chapter 7: Implementation arrangement and Risk assessment

7.1 Project Implementation Arrangements

The project implementation arrangement for the FIP projects is presented in the Figure 7.1. The main implementing agency for all the three projects under FIP will be the BFD under the Ministry of Environment and Forests (MoEF). BFD will nominate a National Project Director (NPD) to head the Project Management Unit (PMU). Under the control of PMU, three Deputy Project Director (DPD) will be appointed by the MoEF for implementing the three projects proposed under the FIP- IP for Bangladesh. All the DPDs will coordinate with NPD to implement their respective projects. The NPD will be guided by the Chief Conservator of Forests (CCF), BFD. MoEF will form a Project Steering Committee (PSC) chaired by the Secretary, MoEF and a Project Implementation Committee (PIC) chaired by the CCF by following the prescribed format of the Planning Commission. . Members of the committees will be represented by the line ministries, associate agencies, NGOs and all relevant stakeholders including the NPD, DPD, concerned officials of BFD, and the representative of the Project Financing Agencies. The NPD has the full responsibility for the successful implementation of all the projects. He will coordinate with other DPDs for developing the detailed project implementation plan, implementation of the projects, administration and finance management and finally coordinating, monitoring, evaluation and reporting activities. PMU will be the main cost center of the project. Necessary technical, financial and administrative staffs will be recruited under the PMU setup for smooth implementation of the project and satisfactory financial management of the projects. DPDs will coordinate with NPD and the PMUs at field level for the implementation of projects. Required number of counterpart officials from BFD will be deputed to the PMU for secretarial services, technical services and reporting on the implementing the projects.

Figure 7.1: Project Implementation Arrangement for the FIP projects



Implementation arrangements for FIP Projects: FIP consists mainly of three projects as described in Table 2.13. Each of the projects will be headed by a Deputy Project Director (DPD). DPD will function under the overall coordination and guidance of the NPD and they will be responsible for implementing and monitoring of the each of the projects through the Project Implementation Units (PIUs). Each of the Forest Divisions within the project area will be treated as a PIU for the project. Each of the PIU will be headed by an Officer with a rank and position of Divisional Forest Officer (DFO)/Deputy Conservator of Forests (DCF). The DPD could be based either in BFD HQ in Dhaka or in the districts. The PMU will provide overall administration, technical, finance management and implementation support to the NPD and DPDs. The technical support for designing project activities will come from BFD and its different wings/units experts, associate agencies etc. All the Assistant Conservator of Forests (ACFs) and subordinate staffs who are posted in different forest divisions/Units will be responsible for assisting DFO/DCF in the implementation and monitoring project activities. Each of the PIU will be cost centers of the projects.

Role of NGOs: NGOs or civil society will have a critical role to play in project implementation through community mobilization and capacity building activities. The national level NGOs and/ or field-based NGOs will assist NPD, DPD and DFOs who will the operate the PIUs at district/forest division level. NGOs will play a critical role of creating awareness, mobilizing local communities including their identification and engagement for developing local participatory institutions, and training for building capacities in those institutions. The component involving forestry outside the forest such as through non-mangrove coastal green belt plantation, quality seedling supply, fruit orchards and homestead gardens will require participation of private nurseries along with NGOs. The FIP-2, which will be implemented on private farm land and homesteads, will require creating awareness and motivation to participate in the afforestation or tree planting programs.

7.2 Lessons leart from implementation of CRPARP and Wildlife projects

CRPARP project under BCCRF and managed by the World Bank involved components such as: Participatory afforestation-reforestation, avenue plantations including agroforestry (planting economically valuable tree species) and alternate livelihood generation. The project was implemented by the BFD which nominated the senior forest officers with a separate PIU and adequate technical and financial management staff. The main project component involving afforestation-reforestation exceeded the targets set under the project. Despite several limitations of the forest department, the afforestation-reforestation area targets were exceeded and the survival rates were also high.

According to Implementation Completion and Results Report (ICR) by the World Bank, "Building appropriate mechanisms to promote community participation in forest resources management and supporting the enhancement of alternative livelihoods and win-win relationship between the BFD and surrounding community are crucial for their sustainability".

7.3 Capacity of the Implementing Agencies

The three projects of FIP (Table 2.13) require adequate technical staff and capacity for designing, implementation and monitoring. Since BFD is the main implementing agency for the three projects, there is a need to ensure adequate technical staff and capacity within BFD.

Besides, there is a need for infrastructure maintenance and logistics to implement the projects.

According to Forestry Master Plan (FMP) of 2017, "All forestry sector institutions are suffering from a whole variety of human resource related problems, which are hindering proper functioning of these institutions. These limitations include shortage of professional man power, inadequate capacity building, inadequate facilities and insufficient funds". Further, there is a severe shortage of technical staff in BFD as well as BFRI (Bangladesh Forest Research Institute) and BFIDC (Bangladesh Forest Industries Development Corporation). Projects such as CRPARP, managed to implement the project mainly due to the adequate financial support available from the project for organizing implementation, involvement of NGOs, capacity building programs, monitoring and evaluation.

The feasibility of implementing the FIP projects based on the existing staff and resources of the forest department would be a challenge. As highlighted by the Forestry Master Plan, there are severe limitations of staff, technical capacity and resources within the BFD. These are long-term challenges and require long term solutions to be initiated by the GoB. However, for successful implementation of the three projects under FIP, there is a need to ensure that the adequate financial resources are available within the project to ensure adequate staffing with technical capacity for BFD. BFD has planned to investment in the institutional development, information system improvement and training for the staffs.

Bangladesh has a reputation of having strong NGOs and civil society organizations. These organizations have been implementing several developmental programs very successfully. Even in the CRPARP, Arannyak Foundation (an NGO) played a critical role in building capacity in rural communities and local institutions in addition to implementing alternate income generation activities. Thus, NGOs/ civil society organization will have to be adequately engaged in activities such as awareness, capacity building, and community engagement, implementing alternate income generation activities and forest protection and management.

Forestry research in Bangladesh is carried out by BFRI, BNH and three universities where professional forestry is taught. BFRI is mandated to carry out need-based operational research support to BFD and other stakeholders. According to FMP, BFRI has limited research facility and inadequate staff. Further, BFD has very limited operational linkages with BFD. Thus, BFRI and the other universities involved in forestry research may require adequate technical capacity and staffing for designing, implementing and monitoring of the FIP projects.

7.4 Monitoring and Evaluation of FIP

Monitoring and Evaluation (M&E) of critical components of FIP implementation: Periodic M&E is necessary for identification of the limitations during the project implementation and provide feedback to the PMU to ensure effective implementation and outcomes. M&E requires continuous and periodic monitoring of bio-physical and socio-economic - institutional indicators and synthesis of the findings. It will be a results-based monitoring and evaluation framework in combination of institutions, quantitative targets, benchmarks, data and political commitment. Other national policy documents will be followed while preparing

the indicators in monitoring and evaluation framework. CIP reporting framework will also be taken into account while preparing monitoring and evaluation of FIP.

BFD has a Resource Information Management System (RIMS) Unit for monitoring the progress and performance of implementation of various forest development programs. Monitoring of forest area, biodiversity, ecosystem services and socio-economic indicators would require significant institutional and technical capacity and reform as needed. M&E may require use of latest remote sensing and GIS techniques, MIS, data management, in addition to adoption of ecological and socio-economic methods. However, according to FMP, the RIMS unit is characterized by inadequate ICT infrastructure and technical staff. Projects such as CRPARP and agencies such as the World Bank, FAO, USAID, UNDP and GIZ have provided some support to RIMS Unit RIMS Unit may equipment for long term solutions to have sustained technical and institutional capacity to hold the responsibility for monitoring and evaluation of the projects

In addition to internal monitoring by the BFD, RIMS Unit and BFRI it is proposed to engage external agencies for independent monitoring and evaluation of the implementation and impacts of project components. A strong partnership will be established with authentic data providers like Bangladesh Bureau of Statistics (BBS) during the project implementation. BFD has already established such partnership with BBS to establish a National Forest Monitoring System. Besides, Forest Reference Level, Safeguard Information System and National REDD Strategy are in the process of development and can be used in monitoring and evaluation of projects.

Communication and dissemination of M&E outcomes are necessary since many agencies and stakeholders apart from BFD will require information on the performance of the projects under FIP. This would include Ministry of Environment of Forests (MoEF), the funding agencies, NGOs, field staff of the project and other supporting agencies. Thus, it is proposed to disseminate the periodic findings of the M&E activities through websites of BFD and FIP, workshops and newspaper releases.

7.5 Risk Assessment

According to FMP, the forest sector of Bangladesh is characterized by several risks and challenges which may impact the successful implementation of the FIP. Some of the risks include (Chapter 1): Over-exploitation of the forest resources, Pressure on forest land for many purposes leading to illegal encroachment and official diversion of forest land to commercial land, Increase in demand for fuelwood, timber and industrial wood, Low investment in forest sector, Lack of demarcation of forest land and boundaries, Inadequate staff in the forest department and inadequate training, Inadequate infrastructure, legal support for enforcing forest laws and for undertaking conservation and afforestation, Lack of research capacity and Inadequate financing. The potential risks directly relevant to FIP and mitigation measures are presented in Table 7.1.

Many of the risks identified in Table 7.1 have been recognised in the National Forest Policy of Bangladesh and the FMP-2017. The forest policy and FMP also have recommended measures to address these risks. Indeed, the various components under the projects of FIP also aim to address these risks and mitigate them especially the ones related to technical and institutional capacity limitations.

Table 7.1: Potential Risks and Mitigation measures

Risks	***Level***	***Mitigation options***
1. Inadequate technical, managerial and administrative staff at BFD may limit effective planning and implementation of the various components of the projects under FIP. This risk has been identified in the Draft updated National Forest Policy and the draft FMP. Projects such as CRPARP and REDD++ have also identified these risks.	High	1. FIP includes dedicated components for strengthening the BFD and related institutions such as RIMS and BFRI. The project will have dedicated staff to support the forest department, the main implementing agency. 2. The PIU, the PD and the Deputy PD will be supported by adequate technical, managerial and financial experts, all supported by FIP funds.
2. Lack of technical capacity within the BFD, BFRI and RIMS Unit. Lack of technical capacity is compounded by inadequate staff resources and capacity building programs.	Moderate	1. FIP components aim to address the risk of limited technical capacity by incorporating activities aimed at building technical capacity of BFD, RIMS, BFRI and other agencies through provision of infrastructure support and training programs. 2. FIP also aims to co-ordinate the training and capacity building programs jointly with other bilateral and multi-lateral agencies.
3. Weak land tenure system, duel administration, incomplete forest reservation process, multiple claims on proprietary rights of forest lands, encroachments and weak enforcement of forest land administration are common drivers for deforestation and forest degradation in Bangladesh. Murky tenure issues (e.g. encroachment, the existence of multiple claims over BFD land, and insecure land ownership) hinder investments in forests and provide disincentives for the sustainable management of forest lands in the country.	High	1. Forestland boundary demarcation, digitization and public access to forest land records proposed under FIP-3 will improve enforcement of forest law, clarify forest land tenure and strengthen governance structure of forest land management in the country. 2. The FIP aims to strengthen forest law enforcement by surveying and demarcating forest land boundary, resolve forest land dispute/ tenure and enhance governance of forest land record use. It is also proposed to conduct forestland survey, demarcation and digitization, updating of land settlement records and reclamation of encroached land through relocation. 3. FIP also aims to increase capacity of BFD officials through skill development training in land and digital survey, mapping and record archiving. This addresses the challenge of obscure and absent land tenure and rights, long pending court cases on forest land and encroachments.
4. **Financial Risk**: The budgetary support to BFD and other related organizations/unit such as RIMS unit and BFRI is low in Bangladesh. Financial resources available for the management of forests are inadequate for the challenges facing the sector. The inadequate funding for forest conservation, demarcation and digitization of forest land and its tenure, afforestation-reforestation, staff	High	1. The FIP aims to generate resources for meeting the challenges identified for the sector. 2. There is a dedicated component for digitization of forest land and tenurial records. 3. Dedicated funding for enhancing the technical staff and its capacity. 4. Activities aimed at provision of tree seedlings and technical support of farmers and communities to undertake tree planting on farms and homesteads will be financially supported under FIP-2. 5. Activities aimed at research and development of climate resilient packages. 6. Activities aimed at building community

recruitment and capacity building, supporting tree planting programs outside the forests, development of community institutions, provision of alternate livelihoods, development of climate resilient forest management practices and research.		institutions and organizations. 7. Financial support for alternate income generation activities.
5. **Lack of coordination**: There is limited coordination especially at ground level between different departments such as BFD, Department of Agriculture Extension, Ministry of Land, DLRS	Low	1. The Steering Committee consisting of representatives of BFD, Ministry of Land, Department of Agriculture Extension, etc will to a large extent help overcome any conflicts and enhance coordination between the agencies managing and implementing programs on land resources.
6. **Lack of private investment**: In Bangladesh, there is little experience for private sector for investing in BFD, due to reasons such as complex laws and regulations related to land, lack of land tenurial rights, absence of financing mechanism from banks due to the risks involved and low productivity of forests and plantations.	Low	1. Dedicated activities aimed at promoting participation of private sector in implementing different activities especially under FIP-2. These include raising nurseries, promotion of economically valuable tree species, alternate income generating livelihood activities. 2. Promotion of value chain in processing and marketing of forest products.
7. **Risk of climate change**: Bangladesh is one of the most vulnerable countries in the world to climate change and extreme events. There are limited resilient strategies and practices to adapt to climate risks. There is inadequate technical capacity to develop climate resilient forest management practices.	Moderate	1. CRPARP project has contributed to building capacity in the BFD on climate change related risks. CRPARP also had organised training and capacity building programs to various levels within BFD, RIMS and BFRI. This experience will help in developing climate resilient practices for the FIP. 2. There is adequate financial support for developing and incorporating climate resilient practices in afforestation-reforestation as well as through alternate income generation activities.

Chapter 8: Results Framework

The implementation and institutional arrangements for FIP are described in Chapter 7. Here, the results framework is presented along with the outcomes of each component, its explanation on how outcome will be achieved, baseline status, methods, periodicity and responsibility.

8.1 FIP: Results Framework

The results framework for FIP is presented in this section. The main purpose of the results framework is to establish a basis for monitoring and future evaluation of the impact, outcomes and outputs of FIP-funded activities.

FIP intends to contribute, in a long-term, transformative manner, to "reduced GHG emissions from deforestation and forest degradation; enhancement of forest carbon stocks". It is also anticipated that there will be socioeconomic co-benefits of FIP interventions that seek "reduced poverty through improved quality of life of indigenous people and forest communities" and environmental co-benefits such as "reduced biodiversity loss and increased resilience of forest ecosystems to climate variability and change".

The results framework for the FIP in Bangladesh is presented in Table 8.1. This represents the broad the outcomes or impacts, explanation for the impact, indicators for assessing the impacts, baseline, data sources, institutional responsibilities for gathering data and the frequency of measurement or monitoring

Table 8.1: Result Framework for FIP in Bangladesh

Project 1: Transformational Outcome - To promote "Sustainable Forests and Livelihoods for reducing emissions from deforestation and forest degradation and enhance Carbon Sequestration, Resilience to Climate Change and Biodiversity Conservation and Improved Livelihoods in Hill forests"					
Outcome/ Impact	*Explanation*	*Indicator*	*Baseline*	*Source of data*	*Responsibility*
Carbon sequestration in the hill forests	This outcome leads to increase in carbon stocks in degraded forests and deforested areas due to restoration and reforestation	1. Tonnes of biomass carbon and soil carbon stocks enhanced compared to baseline in - Degraded hill forest lands - Deforested hill forest lands	Very low biomass and soil carbon stock due to deforestation and over-exploitation of tree biomass leading to low carbon density TBD	*1. Source of data:* - Field measurements *2. Method*: Permanent plots. *3. Periodicity*: Biomass carbon to be measured alternate years. - Soil carbon to be measured once in five years.	PIU - BFRI
Biodiversity conservation	Biodiversity of the deforested lands and degraded forest lands will be enhanced through promotion of natural regeneration, planting of multi-species and native species	1. Biodiversity index 2. Number of tree species 3. Percent of native tree species planted	Very low native biodiversity Index Dominated by weeds or pioneer species – extent pioneer weeds. TBD	*1. Source of data:* - Field measurements of biodiversity (species distribution) *2. Method*: Plot method and identification of tree species in plots *3. Periodicity*: Once in two years along with biomass measurements	PIU - BFRI
Enhanced climate change resilience	Climate change is projected to impact degraded forests, fragmented forests and biodiversity poor forests. Thus, through forest restoration using multispecies and native species, climate resilience of restored forest areas will be	1. Percent of native tree species in the afforested area 2. Forest fragmentation index 3. Biodiversity index 4. Per cent of Native tree species	Current status - degraded, fragmented and with low biodiversity TBD	*1. Source of data*: Field ecological measurements and remote sensing *2. Method:* - Remote sensing mapping for fragmentation and tree crown assessments - Permanent plot method for assessment of biodiversity *3. Periodicity:* Once in two years	

	enhanced				
Project 2: Transformational outcome - Climate change mitigation and adaptation synergy on private lands (farm land, homesteads, TOF planting, etc.) for meeting biomass demand for household and industries and expand carbon sink					
Outcome/ Impact	*Explanation*	*Indicator*	*Baseline*	*Source of data, methods and periodicity*	*Responsibility*
Carbon sequestration through expanding forest area by planting trees (TOFs) in crop lands, private lands and homesteads	This project will increase tree cover on farmlands and homesteads and sequester carbon in the private lands. Further, increased supply of fuelwood and timber from private lands will reduce pressure of deforestation and forest degradation in the public lands/forest lands.	1. Tonnes of biomass carbon and soil carbon stocks enhanced compared to baseline in - marginal crop lands / fallow lands - homestead gardens	Currently there is very limited or no tree biomass carbon stocks in the croplands and homesteads TBD	*1. Source of data:* Field measurements *2.Method:* Selection of permanent cropland plots and homesteads for periodic measurements *3. Periodicity:* *- Biomass Carbon: Once in two years* *- Soil Carbon: Once in five years*	PIU - BFRI
Improved livelihoods by planting economically valuable tree species on private lands; farm lands and homesteads	This project will improve livelihoods at local level by planting economically valuable tree species which provide fruits, nuts, leaves, fuelwood, timber, etc. which can be used by the households or marketed.	1. Number of days of employment generated for timber, fuelwood, etc. production, extraction, processing and marketing. 2. Tonnes of fuelwood and timber harvested annually.	1. Currently, limited employment generation since, there are very few trees or no trees in the proposed croplands and homesteads. 2. Limited or no harvest of fuelwood and timber. TBD	*1. Source of data*: Survey of households, farms and industries *2. Method:* Survey method *3. Periodicity:* Once in 2-3 years	PIU - BFRI
Meeting biomass demands of households and industries	The project aims at meeting biomass demands by production and enhancing supply	1. Tonnes of fuelwood, timber, etc. harvested from croplands and homestead gardens.	1. Currently, very limited biomass is harvested and utilised by the household and	*1. Source of data:* Field survey of quantities of biomass harvested and utilised in the FIP area *2. Method:* Survey of sample	PIU - BFRI

	of timber and forest products to meet household and industrial demands from private lands.		industries in the proposed area.	households, farms and industries *3. Periodicity:* Once in two years	
Project 3: Transformational Outcome - "Securing and conservation of government forestland through physical survey, demarcation and digitization to facilitate reducing emissions from deforestation and forest degradation, enhance carbon sink conservation and sequestration in hill forests and plain land Sal forest"					
Outcome/ Impact	*Explanation*	*Indicator*	*Baseline*	*Source of data*	*Responsibility*
Securing forestland through physical survey and boundary demarcation. Facilitating reduction in Carbon emissions from deforestation and forest degradation and Carbon sequestration through reduced pressure on forests.	1. Land survey, fixing boundaries and demarcation and digital map preparation will facilitate forest protection and reduced pressure on public forest land. This will enable BFD to enforce forest laws, which ban encroachment. This will lead to reduced Carbon emissions from deforestation and forest degradation.	1. Area of forest land surveyed and mapped 2. Reduction in the number of land disputes 3. Reduction in forest land encroachment 4.Number of maps prepared.	1. Currently, forest land is not physically demarked 2. Large number of disputes in courts and tribunals 3. Larger number of encroachments of forest fragments or area encroached in the selected districts or zones.	*1. Source of data:* Field studies in selected villages and divisions *2. Method:* - Survey of area demarked - Survey of number of disputes - Survey of encroachments and area *encroached in selected villages* *3. Periodicity: Once in 2-3 years*	PIU - BFRI
Capacity building for survey, forestland record management and strengthening forestland litigation resolution	1. Strengthened forest department staff with additional tools and methods are expected to enforce forest laws which ban forest encroachment.	Number of forest department staff trained in land survey, mapping and digitization Number of maps prepared. 3. Area demarcated or surveyed	1. Currently, number of forest department staff trained is very limited. 2. Number of forest land maps at local level.	*Source of data*: Field studies. *Method*: Survey of forest department staff *Periodicity*: Once in three years	PIU - BFRI

References

Altrell, D., Saket, M., Lyckebäck, L., & Piazza, M. (2007). National Forest and Tree Resources Assessment 2005-2007 Bangladesh.

Ahmed, F.U., 1995, Homestead Agroforestry of Bangladesh, M.Sc. Thesis, Universsity of Wales, Bangor,UK

Anon. 1994. Climate Change in Asia: Bangladesh Country Report, Regional Study on Global Environmental Issue. Asia Development Bank. 80pp.

Aranyak Foundation Annual Report, 2015

Aranyak Foundation Annual report, 2009

BARC. 2012. Agricultural Research Vision 2030 and Beyond. National Agricultural Technology Project. Phase - I. Bangladesh Agricultural Research Council. Farmgate, Dhaka.

Bangladesh Environment , Forestry and Climate Change Country Investment Plan Second Draft. (2016).

BCCRF. 2013. Forest as first line of defence against climate change. Bangladesh Climate Change Resilience Fund (from website).

BFIDC. 2013. Rubber Statistic. Bangladesh Forest Industries Development Corporation (from website).

BFRI. 1999. Master Plan for 2000-2005, Bangladesh Forest Research Institute, Chittagong.

Choudhury, J.K. and Hossain, M.A.A. 2011. Bangldesh Forestry Outlook. Asia-Pacific Forestry Outlook Study II. Working Paper No. APFSOS II/WP/2011/33. 101pp.

Coudhury, J.K. and Hossain, A. 2009. Asia Pacific Forestry Sector Outlook Studies, Bangladesh Country Report. Department of Forest, Government of Bangladesh.

Department of Environment Ministry of Environment and Forests. (2012). Second National Communication of Bangladesh to the UNFCCC.

FAO. (2015). Guide for country reporting for FRA 2015, 51.

FAO. (2016). *State of the World ' s Forests. Forests and agriculture: land-use challenges and opportunities*. https://doi.org/10.1146/annurev-environ-102014-021358

Forest and Biodiversity, BANGLADESH DELTA PLAN 2100 FORMULATION PROJECT 2015

Forest Department 2010.Integrated Resources Management Plans for the Sundarbans (2010-2020), Vol. 1, Forest Department (FD), Ministry of Environment and Forest, Government of Bangladesh, Dhaka.

General Economics Division (GED), Planning Commission, G. of the P. R. of B. (2015). Seventh Five Year Plan FY2016-FY2020: Accelerating Growth , Empowering Citizens, (October), 785. Retrieved from http://www.plancomm.gov.bd/7th-five-year-plan/

Government of Bangladesh. (2015). Intended Nationally Determined Contributions (INDC) Ministry of Environment and Forests (MOEF) Government of the People ' s Republic of

Bangladesh, 1–15.

Global Forests Resource Assessment, COuntry Report 2015

Hassan, M.M. 2001. The declining forest and causes of deforestation in Bangladesh. *The Bangladesh Observer*. 6 May.

Hossain, M.K. and Haque,A.T.M.R. 2013. *Eucalyptus Dilemma in Bangladesh*. IFES, University of Chittagong.

Hussain, M.K. 2014. Vanishing forest genetic resources of Bangladesh and the strategy of their conservation. Arannayk, Dhaka

Imran, M. 2011. Honey of Sundarbans. *Look Bangladesh*. 16 July, 2011

MoEF. (2009). Bangladesh Climate Change Strategy and Action Plan 2009, 76. Retrieved from http://cmsdata.iucn.org/downloads/bangladesh_climate_change_strategy_and_action_plan_2009.pdf

Mukul, S.A., Biswas, S.R., Rashid, A.Z.M.M., Miah, M.D., Kabir, M.E., Uddin, M.B., Alamgir, M., Khan, N.A., Sohel, M.S.I., Chowdhury, M.S.H., Rana, M.P., Rahman, S.A., Khan, M.A.S.A., Hoque, M.A. 2014. A new estimate of carbon for Bangladesh forest ecosystems with their spatial distribution and REDD+ implications. International Journal of Research on Land-use Sustainability, 1(1): 33-41

Nations, U. (2000). *Forest Resource Assessment Report, 2000*.

Rahman, L. M. (2016). *Bangladesh National Conservation Startegy Forest Resources*. https://doi.org/2016

Reach, G., & Engagement, D. (2014). Water resources institute 2015 annual report.

Redd, U.-, Redd, U.-, & Redd, U.-. (n.d.). The UN-REDD Programme UN- REDD.

Reddy, C. S., Pasha, S. V., Jha, C. S., Diwakar, P. G., & Dadhwal, V. K. (2016). Development of national database on long-term deforestation (1930-2014) in Bangladesh. *Global and Planetary Change*, *139*(February), 173–182. https://doi.org/10.1016/j.gloplacha.2016.02.003

Sivaram, M., Sandeep, S., & Matieu, H. (2016). Error Propagation in Forest Biomass Assessment, Indian Foirester, 142, 1, 2016.

Uddin S.M., Shah, M.A.R., Khanom, S.,Karimon Nesha, K.2013. Climate change impacts on the Sundarbans mangrove ecosystem services and dependent livelihoods in Bangladesh

World, T. (n.d.). *lUCN*.

ANNEX

Comments and Suggestions from Dr Saleemul Huq, Director, International Centre for Climate Change and Development (ICCCAD), Independent University, Bangladesh, Dhaka and International Institute of Environment and Development, London

1. General comment:

I felt that overall the report was quite comprehensive and well presented.

-Response: Noted with thanks.

2. Specific comments:

2.1. Addressing adaptation and poverty alleviation:

I felt the opportunity to address climate change through both mitigation as well as through adaptation was well recognised. However, there may be more scope to expand on the opportunities for tree planting as an adaptation as well as a means of tackling poverty both in private lands as well as in Forest lands through local community based forest protection.

Response-1:

i) The Expert Reviewer also agrees that the FIP has the main goal of promoting "Mitigation" of climate change through forest sector. At the same time adequate consideration is given in all the 3 FIP projects to ensure resilience or adaptation to the impending climate change. Some of the interventions / activities aimed at adaptation or resilience are as follows:

- *a. FIP project-1 aims at conserving and restoring biodiversity rich natural forests as an adaptation measure, since biodiversity rich forests are less vulnerable to climate change than monoculture or exotic species dominated plantations (FIP 1).*
- *b. Alternate Income Generating Activities are included in FIP-1 aimed at diversifying the income sources to reduce vulnerability to climate variability and climate change related risks.*
- *c. All tree plantation programs under TOF (FIP-2) will be dominated by economically valuable "Native tree species" which are likely to be less vulnerable to climate risks.*

ii) Need for addressing poverty through forestry is well recognized. The FIP-1 & 2 have activities aimed at tackling poverty:

- *a. Under FIP-1: Restoration of degraded and deforested hill forests will promote biodiversity. Biodiversity rich forests will create opportunities for harvesting NTFPs (non-timber forest products), whose collection, processing and marketing will create employment and incomes, contributing to poverty reduction.*
- *b. Under FIP-2: All farmers in the project areas will be provided with access to economically valuable fruit, seeds, leaves, etc. yielding tree seedlings, which contribute to additional income generation aimed at tackling poverty.*

c. *Further FIP-2: even landless households will participate in the program by planting economically valuable fruit trees as part of homestead gardens, contributing to employment and income generation.*
d. *The co-benefits of FIP interventions on employment and income generation leading to reduction of poverty are covered in detail in Chapter 4.*

Bangladesh has developed some successful models of social forestry as well as community based forest protection which could be expanded into, other areas of the country.

Response: The Social forestry and community forestry guidelines and provisions will be adopted under FIP-1, in protecting and managing restoration of degraded and deforested hill forest lands.

2.2. Need for better research:

I agree with the finding that more research is required but feel that more emphasis can be made on improving the quality of research and supporting more multi-disciplinary research involving more social sciences as well as other non-forest research institutions and universities. It may be worth taking a look at the climate change research platform Gobeshona (see: www.gobeshona.net) as an example of multi-disciplinary and multi-institutional research collaboration.

Response: Agree with the Expert Reviewer that there is need for multi-disciplinary and multi-institutional research in forestry. This is a long-term issue to be addressed by the Ministry of Environment and Forests of Govt. of Bangladesh. In fact the long term research issue is being adequately addressed under the proposed "SUFAL" project funded by the World Bank and numerous donor supported projects by FAO, UNDP, USAID, GiZ, IUCN, etc. Even the Forestry Master Plan has highlighted the need for multi-disciplinary and multi-institutional research and has suggested long term measures for Govt. of Bangladesh. FIP projects are small scale projects and for short periods, so long term research may not be the focus.

3. Future directions:

While, this problem may have arisen after the report was drafted, I feel that the influx of hundreds of thousands of Rohingya refugees from Myanmar into Bangladesh is a new and critical additional threat to the forest areas in Bangladesh near the Myanmar border. Hence a programme to address protection of both forest and General environment in the areas housing the refugees should be given the highest priority for investment.

Response: Agreed that influx of Rohinga refuges will potentially lead to an environmental crisis leading to pressure on forest resources, contributing to degradation and loss of forests and biodiversity. This crisis should be considered with urgency to minimize the adverse impacts on forest biodiversity, carbon and other ecosystem services.
However, due to the uncertainties and the complexities involved, this issue may not be directly relevant to the FIP projects. Further, the Forest Divisions with the refugees are not part of the FIP projects.