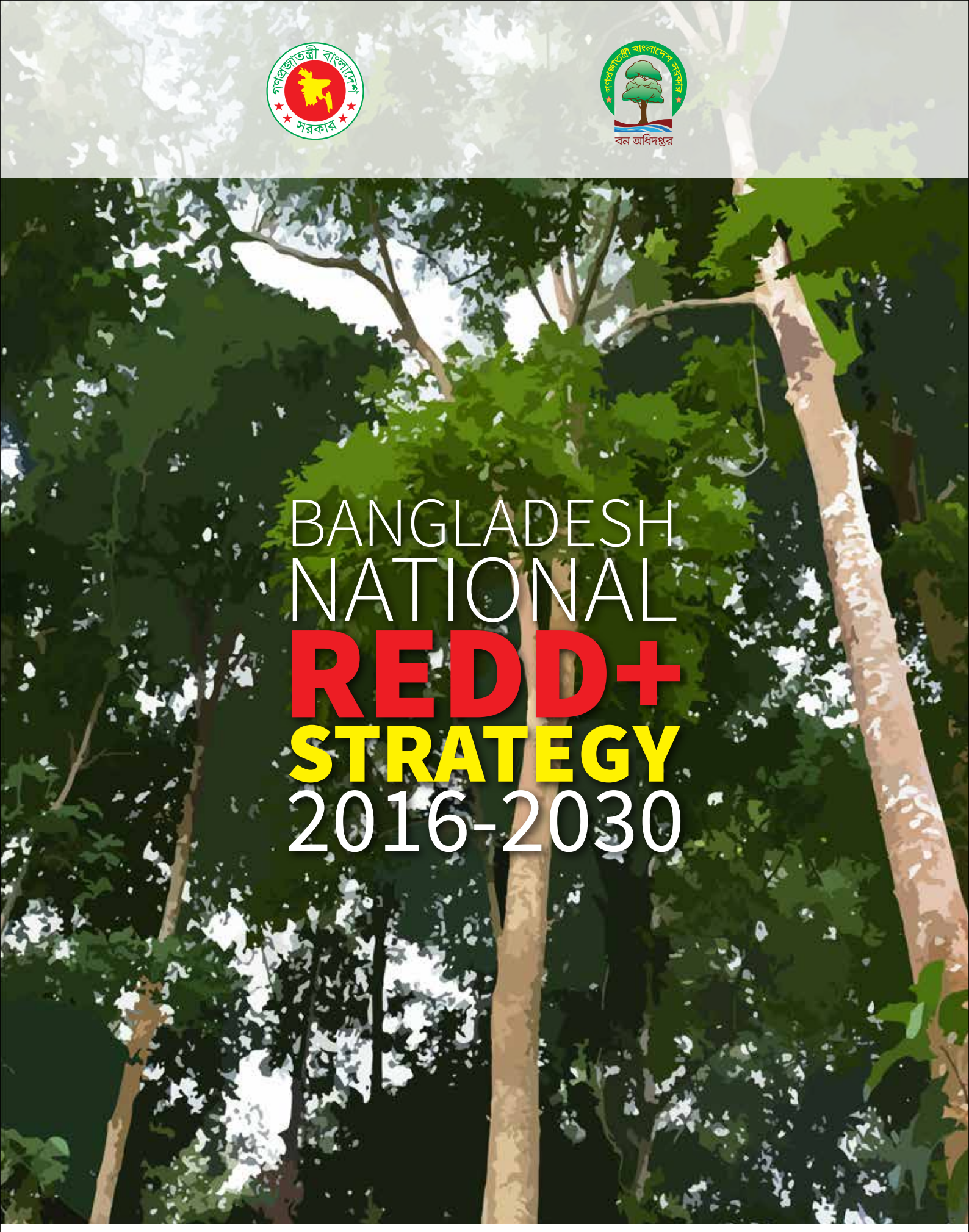


BANGLADESH NATIONAL REDD+ STRATEGY 2016-2030

Bangladesh Forest Department
Ministry of Environment, Forest and Climate Change
Government of the People's Republic of Bangladesh

ISBN: 978-984-34-7228-1

Published by:
Bangladesh Forest Department
Ministry of Environment, Forest and Climate Change
Government of the People's Republic of Bangladesh
Bana Bhaban, Plot – E-8, B-2, Agargaon, Sher-E-Bangla Nagar,
Dhaka – 1206, Bangladesh.

Published in:
April 2022
Dhaka, Bangladesh.

Citation:
GOB.2022.Bangladesh National REDD+ Strategy (BNRS): 2016-30. Bangladesh Forest Department, Ministry of Environment, Forest and Climate Change, Government of the People's Republic of Bangladesh, Dhaka, Bangladesh. .

Produced by:
Publication of this document has been made possible under project titled "UN-REDD Bangladesh National Programme", a project of Bangladesh Forest Department, Ministry of Environment, Forest and Climate Change.

UN-REDD PROGRAMME

Food and Agriculture Organization of the United Nations | UNDP | UN environment

Printed by: Progressive Printers Private Limited

Bangladesh National REDD+ Strategy (BNRS): 2016-2030

Ministry of Environment, Forest and Climate Change
April 2022

Minister
Ministry of Environment, Forest and Climate Change
Government of the People's Republic of Bangladesh

MESSAGE

The Conference of Parties to the UNFCCC adopted several decisions from 2007 to 2013 on REDD+ and these decisions became an integral part of Paris Agreement at COP 21 in 2015. REDD+ is the global mechanism for reducing emission from forestry sector in developing countries. In order to reduce emission from forestry sector, Bangladesh developed the National REDD+ Strategy for 2016-2030. .

The Bangladesh National REDD+ Strategy (BNRS) depicts the firm commitment of the Government of the People's Republic of Bangladesh towards achievement of the objective of the Convention. The BNRS provides detailed actions and measures to reduce deforestation and forest degradation and enhance forest carbon stock in the country. It elaborates drivers, areas of deforestation and forest degradation, sources of greenhouse gas (GHG) emissions and removal by sinks, and highlights mitigation measures to be taken by 2030.

It also stresses the need for collaboration and support of the stakeholders at local, national and global levels. It highlights the need for a more collaborative effort and the necessity to strengthen the coordination, networking and information flows among ministries, different levels of government and civil society for successful implementation and achievement of stated goals.

Forest sector policy in Bangladesh promotes conservation of forests through engagement of local people. The afforestation programme in coastal areas is a key programme ensuring stability of newly accreted land and at the same time protecting communities from storm surge. Social forestry programme has been very successful over decades contributing towards forest and tree cover and at the same time improving livelihoods of poor communities. Reforestation and enrichment plantation programmes have been key in maintaining the forest cover and ensuring flow of non-carbon benefits to the society. We need to increase the rate of various plantation programmes and at the same time reduce deforestation and forest degradation. The Ministry of Environment, Forest and Climate Change, the Sustainable Renewable Energy Sustainable & Renewable Energy Development Authority, the Power Division, the Ministry of Power, Energy and Mineral Resources, the Ministry of Land, the Ministry of Finance and other key ministries will work together to bring renewed momentum towards achievement of the strategy.

I would like to take this opportunity to express my gratitude to the officials and experts of the Ministry of Environment, Forest and Climate Change including the Forest Department, to other related ministries and government organizations, involved non-government organizations, academia, local communities for their dedication and commitment in the preparation of this document through a participatory process.

Finally, I would like to request that all officials, experts and stakeholders to do their utmost, to mobilize support and resources for implementation of the strategy for national and global benefits.

MD. SHAHAB UDDIN, M.P.

Deputy Minister
Ministry of Environment, Forest and Climate Change
Government of the People's Republic of Bangladesh

MESSAGE

Climate change knows no boundary, civilization and race. In the rapidly growing economic context like Bangladesh, climate change will put additional challenges and risks, put pressure on resources to adopt to changing environment. In this context, there is no alternative other than to reduce emission of greenhouse gases (GHGs). And one of the most effective and economic pathways to achieve this is by reducing loss of forests, conserving and increasing forests horizontally.

The Bangladesh National REDD+ Strategy (BNRS) enumerates how to reduce forest loss and where to conserve and to increase forest cover. It details who are primary actors and how to get everyone engaged. The Ministry of Environment, Forest and Climate Change will lead implementation of the strategy with support from allied ministries and departments, involving people on the ground.

The government is already committed to protect and conserve our forests. More than half of the Sundarbans have been declared as protected areas. Ban on tree felling from natural forests has been extended. Financial allocation to forestry sector has increased in the last five years. Plantation programme has increased recently. However, there are ample opportunities to do more in tandem with other sectors so that progress is more stable. Collaboration and engagement of communities at the local level for protection, conservation and sustainable resource management will be imperative to maintain and increase forest cover. Awareness raising will be key in bringing change in the mindset of the people. Achievement of other sectoral targets i.e., on renewable energy especially clean cooking technologies will be necessary to build a solid platform for the BNRS.

Reducing emission and storing carbon is not the only objective of the BNRS. Rather, sustainable livelihoods of local communities, meeting the demand of the society, conservation of biodiversity and sustainable flow of non-carbon benefits are also targeted. Overall, BNRS will have positive impact on our current and future society for livelihoods and environment.

Bangladesh remains committed to global goal under UNFCCC. We are also committed to strengthen our mitigation effort by adopting the BNRS. The Government will take necessary steps towards successful implementation of the same and requests support from global communities and national stakeholders to reduce deforestation and forest degradation in the country.

Habibun Nahar

HABIBUN NAHAR, M.P.

Secretary
Ministry of Environment, Forest and Climate Change
Government of the People's Republic of Bangladesh

FOREWORD

Reducing vulnerabilities and impacts of climate change is a major priority area for Bangladesh. The Government at the national level bringing policy changes, strengthening coordination, allocating resources and accordingly implementing programmes. Formulation of several key strategic documents paved the way for increased adaptability and resilience against climate change impacts.

The Bangladesh National REDD+ Strategy (BNRS) is the first detailed forest sectoral strategy, laying out policies and measures (PAMs) to reduce emission from deforestation and forest degradation and to increase forest carbon stock of the country. The BNRS sets a vision, a goal and associated targets to be achieved by 2030. The PAMs identified are not new, all relevant ministries have already identified these as respective priorities. The BNRS also adopts cross-sectoral targets and coalizing together for greater impacts and multiplying benefits. Hence the BNRS is not the strategy for the forest sector alone, rather it is an amalgamation of shared responsibilities. Accordingly, the BNRS emphasizes close coordination, collaboration and support among government ministries and departments towards a common goal.

The formulation of BNRS is among the four (4) key elements a country requires in order to be ready for result-based payment. The country in 2019 submitted its Forest Reference Level (emission level) to the UNFCCC, which is a baseline emission from forestry sector, against which the performance of a country will be measured. The country has also developed a forest monitoring system to register changes in forest land cover and emissions that may result from implementing the strategic actions. The fourth element, safeguard and safeguard information system will be developed sooner bringing the country's readiness to desired level.

The process of developing the BNRS was rigorous and thorough. It involved all national and local stakeholders, indigenous groups, experts, academia, civil society, NGOs in a three years effort supported by UNDP and FAO under the UN-REDD programme. The capacity gained, the knowledge created, and the information generated through the formulation process will pave the way for further updating of BNRS and enhancement in the future.

The Ministry of Environment, Forest and Climate Change extends gratitude to all actors who have participated in formulating the Strategy and seeking kind cooperation for successful implementation of the same. Through collaborative effort, the county will be able to reduce emission from forestry sector and at the same time, increase carbon removal and non-carbon benefits for the society.

MD. MOSTAFA KAMAL

Chief Conservator of Forests
Bangladesh Forest Department

ACKNOWLEDGEMENTS

Formulation of the Bangladesh National REDD+ Strategy (BNRS) involved a series of studies, surveys, trainings, numerous consultations from local to national level that were conducted by the Bangladesh Forest Department, under guidance of Ministry of Environment, Forest and Climate Change. Many policy makers, key government officials, experts, academia, civil society organizations, NGOs, local community people and representatives of indigenous groups were involved in formulating this important document.

At the outset, I would like to express my gratitude to the Honourable Minister, Ministry of Environment, Forest and Climate Change (MoEFCC), Mr. Md. Shahab Uddin, M.P. and Ms. Habibun Nahar, M.P., Honourable Deputy Minister, and to Mr. Md. Mostafa Kamal, the Secretary, MoEFCC, for their strategic guidance during the formulation of the strategy.

I would like to thank our former Honourable Minister, Mr. Anisul Islam Mahmud, M.P. and Mr. Abdullah Al Islam Jakob, M.P., Honourable Deputy Minister and also former Secretaries, Dr. Kamal Uddin Ahmed, Mr. Istiaque Ahmad and Abdullah Al Mohsin Chowdhury, for their support during the various stages of the implementation of this project.

I must acknowledge the contribution of all the conveners and members of the Project Steering Committee, Project Implementation Committee, Programme Executive Board, and the then Additional Secretary, Deputy Secretaries, Senior Assistant Chief for their support to the project. I also acknowledge the contribution of the Strategy Review Committee members under the leadership of Mr. A. Shamim Al Razi, Additional Secretary and Ms. Zakia Afroz, Joint Secretary of the ministry.

Also need to be recognized, the important contributions of Mr. Rakibul Hasan Mukul, Deputy Chief Conservator of Forests, Bangladesh Forest Department & former National Project Director, UN-REDD Bangladesh National Programme, Md. Zaheer Iqbal, Deputy Conservator of Forests and Dr. Mariam Akhter, Deputy Conservator of Forests and UNDP and FAO for their technical and facilitation support. I must also thank the UN-REDD Programme for their support to the country.

Finally, I would like to gratefully acknowledge inputs by local forest dependent communities, indigenous groups, women groups, government officials, experts, academia, civil society organizations, NGOs and private sector for their involvement and contribution to the Bangladesh REDD+ Strategy development.

MR. MD. AMIR HOSAIN CHOWDHURY

ACRONYMS AND ABBREVIATIONS

AGB	Above Ground Biomass
AIGA	Alternative Income Generating Activity
BB	Bangladesh Bank
BFD	Bangladesh Forest Department
BCC	Bangladesh Computer Council
BARI	Bangladesh Agricultural Research Institute
BATB	British American Tobacco Bangladesh
BCSIR	Bangladesh Council of Scientific and Industrial Research
BEZA	Bangladesh Economic Zones Authority
BBS	Bangladesh Bureau of Statistics
BGB	Below Ground Biomass
BSGI	Bangladesh Society of Geoinformatics
BUET	Bangladesh University of Engineering and Technology
BNRS	Bangladesh National REDD+ Strategy
BFIDC	Bangladesh Forest Industries Development Corporation
BFIS	Bangladesh Forest Information System
BFI	Bangladesh Forest Inventory
BFRI	Bangladesh Forest Research Institute
BNH	Bangladesh National Herbarium
CEGIS	Center for Environmental and Geographic Information Services
CMO	Community Management Organisation
CPG	Community Petrol Group
COP	Conference of Parties
CO2	Carbon di-oxide
CREL	Climate Resilient Ecosystem and Livelihood
CHTRC	Chittagong Hill Tract Regional Council
CHT	Chittagong Hill Tracts
CSO	Civil Society Organization
CTG	Chattagram
CNRS	Centre for Natural Resources Studies
CU	Chattagram University
GCF	Green Climate Fund
DC	Deputy Commissioner
DAE	Department of Agriculture Extension
DOE	Department of Environment
DLRS	Department of Land Record and Survey
DS	Deputy Secretary
DU	Dhaka University
DWM	Dead Wood Materials
ERD	Economic Relations Division
FAO	Food and Agriculture Organization
FENTC	Forest Extension Nursery & Training Center
FSO	Forest Settlement Officers
FPIC	Free, Prior and Informed Consent
FRL	Forest Reference Level
GIS	Geographic Information System
GRS	Grievance Redress System
GHG	Greenhouse Gas; primary greenhouse gases are water vapor, carbon dioxide, methane, nitrous oxide and ozone.
GHGI	Greenhouse Gas Inventory
HHs / hhs	Households
ICS	Improved Cook Stoves
IPCC	Intergovernmental Panel on Climate Change
IDCOL	Infrastructure Development Company Limited
IUCN	International Union for Conservation of Nature
KU	Khulna University

LGED	Local Government Engineering Department
LULUCF	Land Use, Land-Use Change and Forestry
LPG	Liquefied petroleum gas
MOEFCC	Ministry of Environment, Forests and Climate Change
MOCHTA	Ministry of Chittagong Hill Tracts Affairs
MOFL	Ministry of Fisheries and Livestock
MOHPW	Ministry of Housing and Public Works
MOSW	Ministry of Social Welfare
MOWCA	Ministry of Women and Children Affairs
MRV	Measurement, Reporting and Verification
MOL	Ministry of Land
NDC	Nationally Determined Contribution
NFMS	National Forest Monitoring System
NFI	National Forest Inventory
NGO	Non-Governmental Organisation
NPD	National Project Document
NTFPs	Non-Timber Forest Products
PAMs	Policies and Measures
PD	Power Division
PKSF	Palli Karma Sahayak Foundation
RDCD	Rural Development and Cooperatives Division
REDD+	Reducing emissions from deforestation and forest degradation; conservation of forest carbon stock, sustainable management of forests and enhancement of forest carbon stocks
RIMS	Resource Information Management System
RF	Reserved Forest
R-PP	REDD+ Readiness Preparation Proposal
RS	Remote Sensing
RSF	REDD+ Stakeholder Forum
RTHD	Road Transport and Highways Division
SDG	Sustainable Development Goal
SoB	Survey of Bangladesh
SoI	Summary of Information
SLMS	Satellite Land Monitoring System
SMART	Spatial Monitoring and Reporting Tool
SRDI	Soil Resource Development Institute
SREDA	Sustainable and Renewable Energy Development Authority
SPARRSO	Space Research and Remote Sensing Organization
SUST	Shahjalal University of Science and Technology
SIS	Safeguard Information System
tCO_2-eq/year	Tons of carbon dioxide equivalent per year
TWGs	Technical Working Groups
UNFCCC	United Nations Framework Convention on Climate Change
USF	Un-classified State Forest
UNDP	United Nations Development Programme
UNHCR	United Nations High Commissioner for Refugees
UN-REDD	The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries

CONTENTS

ANNEX

LIST OF FIGURES

LIST OF TABLES

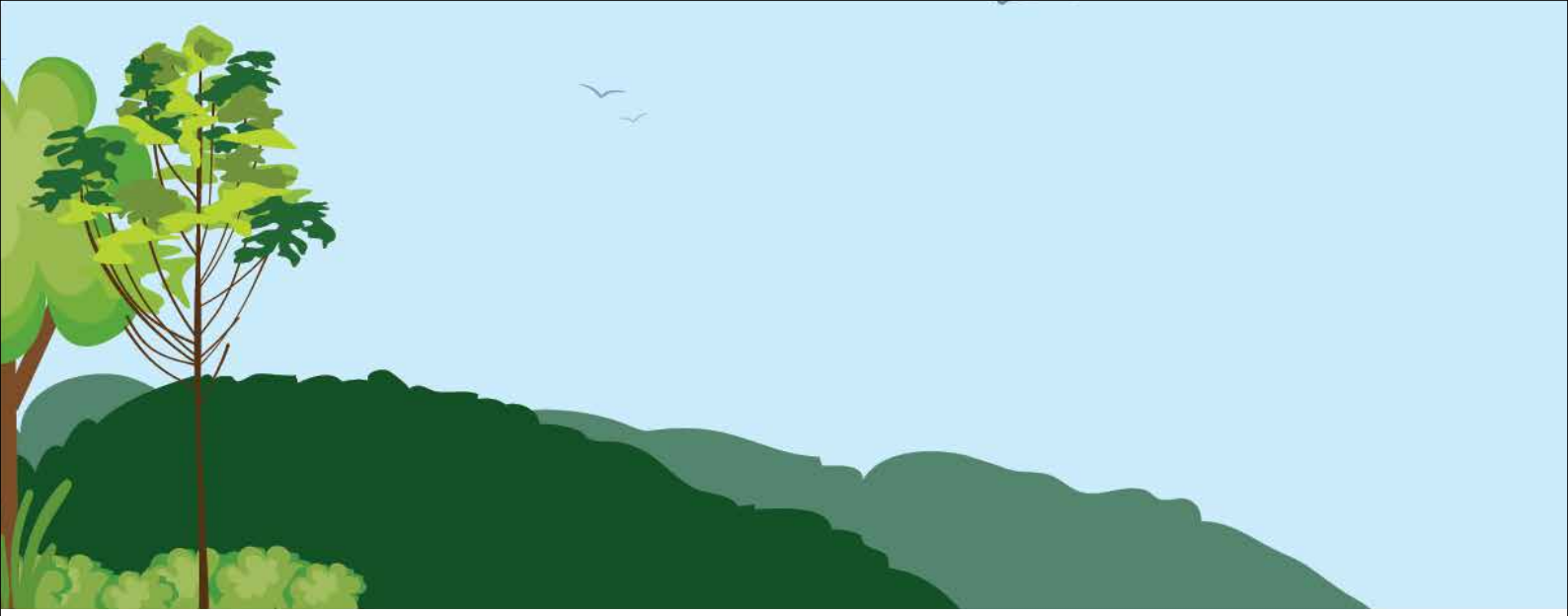
EXECUTIVE **SUMMARY**

Bangladesh is committed to achieving a sustainable development pathway that delivers broad based economic growth while also contributing to the global fight against climate change. As part of this approach, and with support from the UN-REDD Programme[1] Bangladesh has been working, since 2010, to build capacity for and develop a comprehensive approach to reducing Greenhouse Gas (GHG) emissions from the country's forests as well as increasing their capacity for GHG absorption. This approach will form part of Bangladesh's efforts under the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement. Specifically it will allow Bangladesh to participate in a results-based financing mechanism under the UNFCCC, which is designed to provide positive incentives for the reduction of emissions from deforestation and forest degradation in developing countries, as well as support to the role of conservation of forests, sustainable management of forests, and enhancement of forest carbon stocks in those countries – this mechanism is commonly referred to as REDD+.

During the REDD+ readiness phase, the country has formulated the present Bangladesh National REDD+ Strategy (BNRS), its Forest Reference Level (FRL) and its National Forest Monitoring System (NFMS). A plan to set-up a Safeguards Information System (SIS) element has been developed and will be implemented in parallel to the BNRS implementation.

The BNRS is based on a multi-sectoral approach to reduce deforestation and forest degradation and to enhance forest carbon stock and represents the culmination of this readiness phase. It provides a summary of both the work already achieved in Bangladesh and what actions will be taken in the future. It will act as the central guidance document for the Government of Bangladesh, who will lead its implementation through the Ministry of Environment, Forests and Climate Change (MoEFCC), as well as other stakeholders, as the country moves towards implementing actions on REDD+.

[1] The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries was launched in 2008 and builds on the convening capacity and technical expertise of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UN Environment).



Extensive consultations with stakeholders from national down to grass root level took place to develop the BNRS, supported by recent data and a systematic alignment with existing national policy framework.

THE COUNTRY'S VISION FOR REDD+ IS:

'To facilitate and catalyze transformational change in the forest sector to lower GHG emissions, enhance conservation of biodiversity and ecosystems, sustain community livelihoods, and stronger long-term economic growth'

Based on land use change analysis between 2000 and 2015, GHG emission (CO2) at the national level from the forestry sector is 1,188,971 tCO2-eq/year and removal is -814,718 tCO2-eq/year. This FRL will be monitored, measured, reported and verified during the BNRS implementation for potential results-based payments.

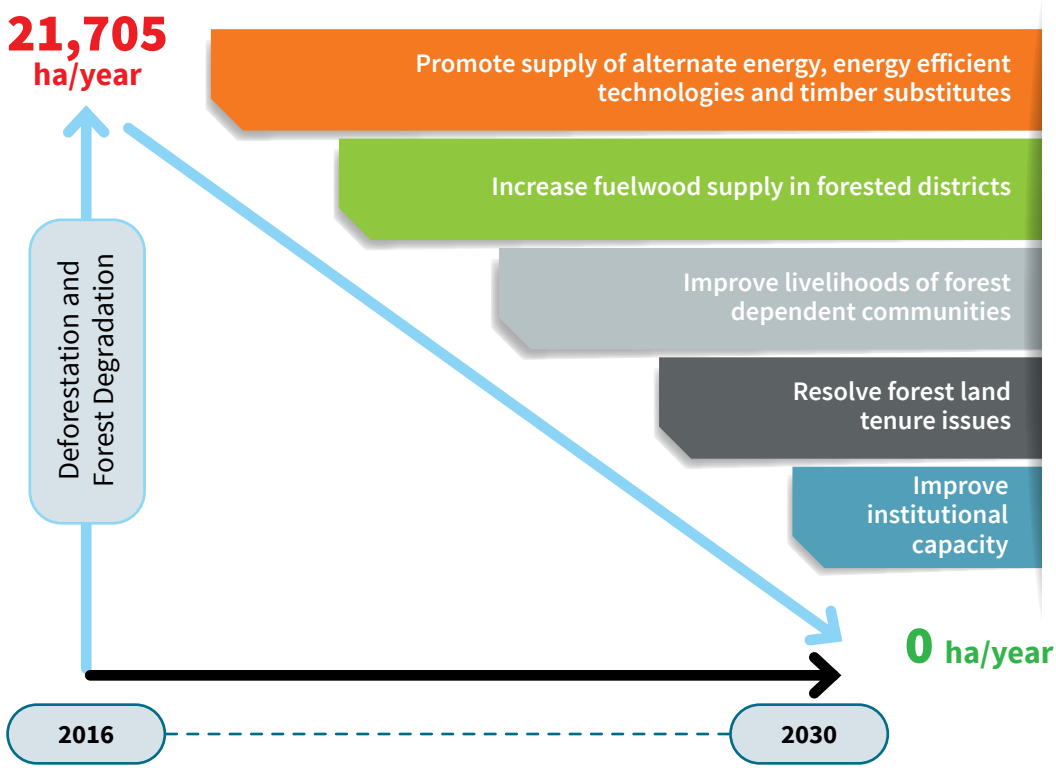
The duration of the BRNS is from 2016 to 2030. The BNRS aligns with the Country's SDG target of achieving 16% forest cover by 2030. To reach this national goal, the BNRS aims to protect and conserve 1,269,070 ha of existing forest, reforest 637,259 ha and restore/enrich 173,498 ha of degraded forests. The BNRS also intends to increase in-country capacity for forest management, improve livelihood of forest dependent communities, reduce illegal encroachment into natural forests and reduce pressure of fuelwood collection and timber harvesting.

To realize Bangladesh's REDD+ vision and goals and to effectively address key drivers of deforestation and forest degradation, the BNRS aims to implement 17 policies and measures (PAMs) under two Strategic Areas – reduce deforestation and forest degradation and enhance forest carbon stock – divided into in six Thematic Areas:

1) Promote supply of alternate energy, energy efficient technologies and timber substitutes;
2) Increase fuelwood supply in forested districts;
3) Improve livelihoods of forest dependent communities;
4) Resolve forest land tenure issues;
5) Improve institutional capacity; and
6) Reforest/Afforest, restore and conserve.

These thematic areas are by no means mutually independent, and thus effective cross-sectoral coordination is essential to ensuring and maximizing their collective outcomes.

STRATEGIC AREA 1: REDUCE DEFORESTATION AND FOREST DEGRADATION



THEMATIC AREA 1

Promote supply of alternate energy, energy efficient technologies and timber substitutes

The targets are to supply 6,500,000 clean cooking stoves and other devices to poor households (of which 2,000,000 in the Hill zone), 10,000 units to institutions i.e., restaurants, mess, hostels (of which 5,000 in CHT) and as well as continuous supply of LPG cookers for all forcibly displaced Myanmar Citizen households in camps (209,225 - as per UNHCR[2] January 2020 data); to establish 830 environment friendly (of which 52 is non-fired technology) brick kilns in 35 forested districts; to promote alternative to fuelwood for 5,000 barns for tobacco curing by creating 200 briquette making entrepreneurs and to increase the use of processed timber and laminated wood to decrease the demand for solid wood.

SPECIFIC PAMS

PAM 1 - Promotion of clean cooking & other devices to households, small businesses and institutions

PAM 2 - Continuous supply of LPG cookers for forcibly displaced Myanmar citizen camp

PAM 3 - Environment friendly technology including non-fired brick manufacturing for replacing traditional bricks kilns

PAM 4 - Sustainable supply of alternative fuel for tobacco curing

PAM 5 - Increase the use of processed timber, laminated wood, cane, bamboo and rattan products

[2] https://data2.unhcr.org/en/situations/myanmar_refugees

THEMATIC AREA 2

INCREASE FUELWOOD SUPPLY IN FORESTED DISTRICTS

The target is to increase availability and quality (i.e., fast growing, high calorific value) of fuelwood seedlings (through conventional nurseries and tissue culture), to develop alternative fuelwood sources outside natural forest (10,000 km of stirp plantation) and to develop integrated forestry models (incl. alternative fuelwood sources) at the homestead level (700,000 households).

SPECIFIC PAMS

PAM 6 - Establish structures (nurseries & tissue culture facilities) for increasing fuelwood seedlings stock

PAM 7 - Establish fuelwood plantation on marginal land under the social forestry programme

PAM 8 - Promotion of integrated homestead forestry models

THEMATIC AREA 3

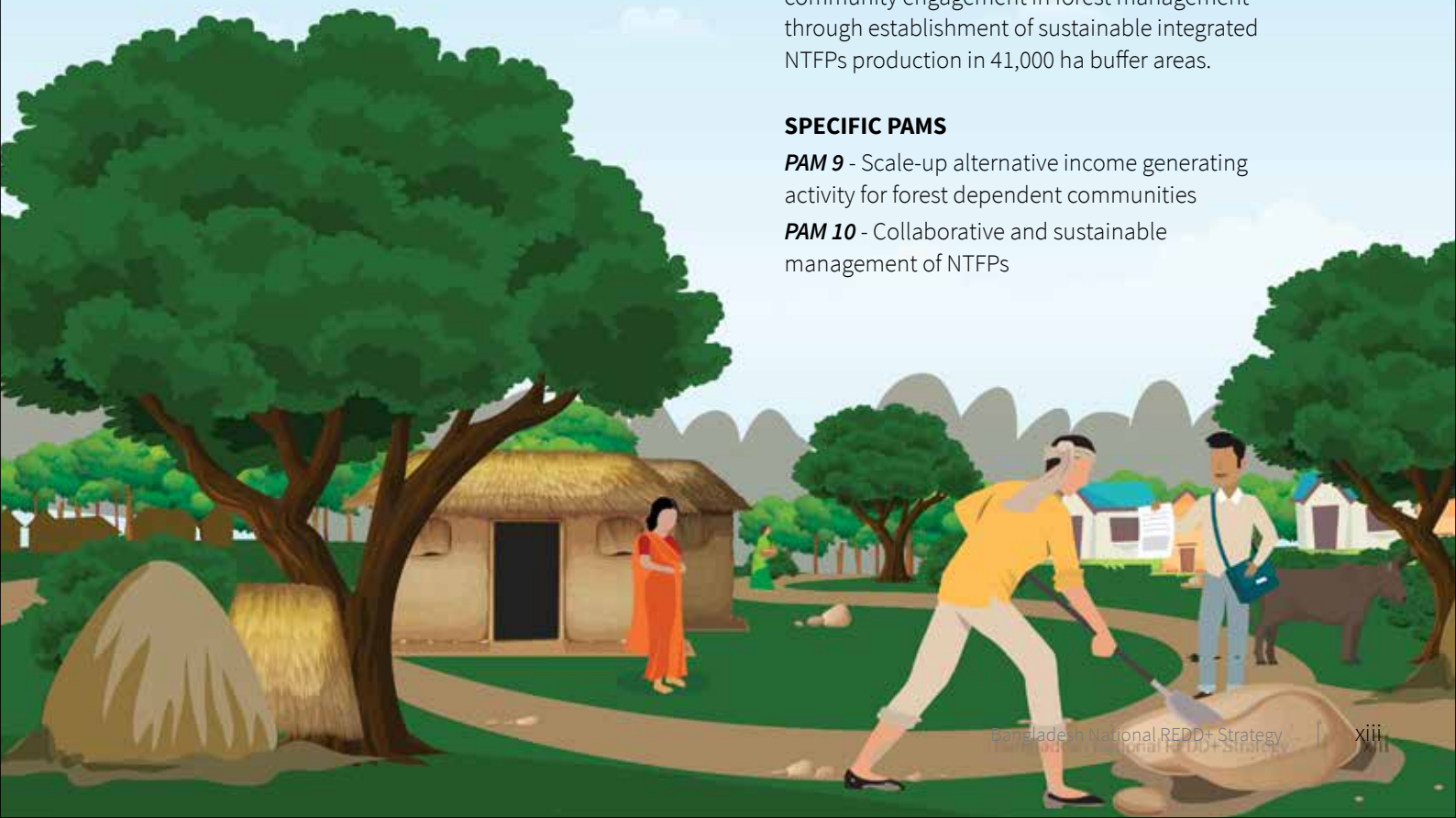
IMPROVE LIVELIHOODS OF FOREST DEPENDENT COMMUNITIES

The targets are to support at least 500,000 poor households (with emphasis on CHT) with Alternative Income Generating Activity (AIGA), and 500,000 households though improved accessibility to government programmes and to support community engagement in forest management through establishment of sustainable integrated NTFPs production in 41,000 ha buffer areas.

SPECIFIC PAMS

PAM 9 - Scale-up alternative income generating activity for forest dependent communities

PAM 10 - Collaborative and sustainable management of NTFPs



THEMATIC AREA 4

RESOLVE FOREST LAND TENURE ISSUES

The targets are to survey and demarcate 1,000,000 ha of forest land, to resolve land ownership in encroached settlements, to resolve forest land related cases and writ petitions, to complete 486,750 ha of reservation and to improve the coastal forest land development and transfer mechanism.

SPECIFIC PAMS

PAM 11 - Modernization of forest land management system

PAM 12 - Resolution of forest land related cases

PAM 13 – Improvement of forest land management system

THEMATIC AREA 5

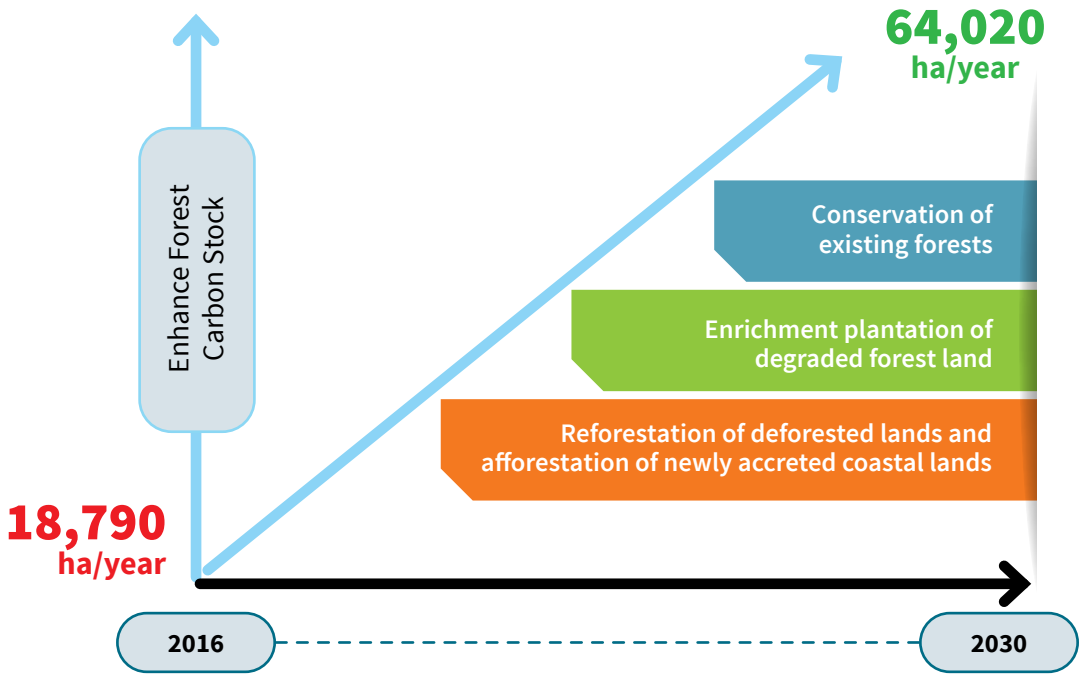
IMPROVE INSTITUTIONAL CAPACITY

The targets are to recruit 2,386 officials under the existing organogram, 7,676 officials periodically under the proposed organogram (17,800) and to organize skills development training program for 5,275 officials.

SPECIFIC PAMS

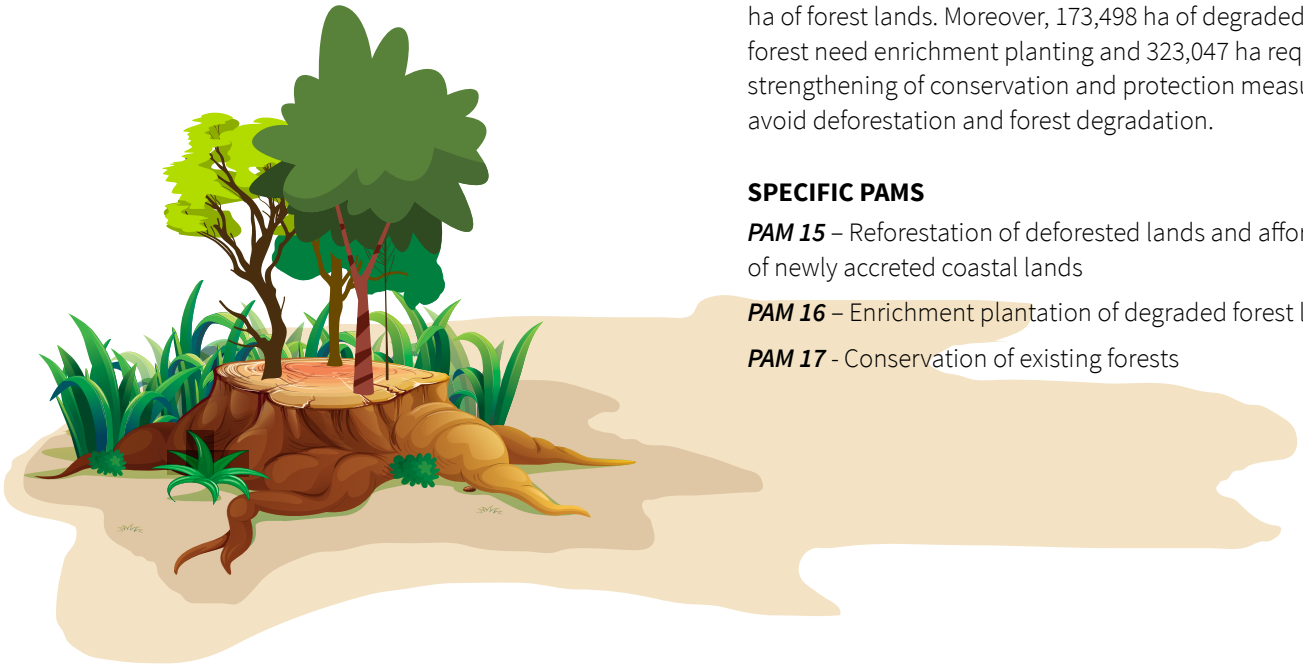
PAM 14 - Increase capacity of the BFD through recruitment and targeted trainings

STRATEGIC AREA 2: ENHANCE FOREST CARBON STOCK



THEMATIC AREA 6

REFOREST/AFFOREST, RESTORE AND CONSERVE



The target is to bring up the forest cover to 16%, which corresponds to the afforestation/reforestation of 637,259 ha of forest lands. Moreover, 173,498 ha of degraded forest need enrichment planting and 323,047 ha require strengthening of conservation and protection measures to avoid deforestation and forest degradation.

SPECIFIC PAMS

PAM 15 – Reforestation of deforested lands and afforestation of newly accreted coastal lands

PAM 16 – Enrichment plantation of degraded forest land

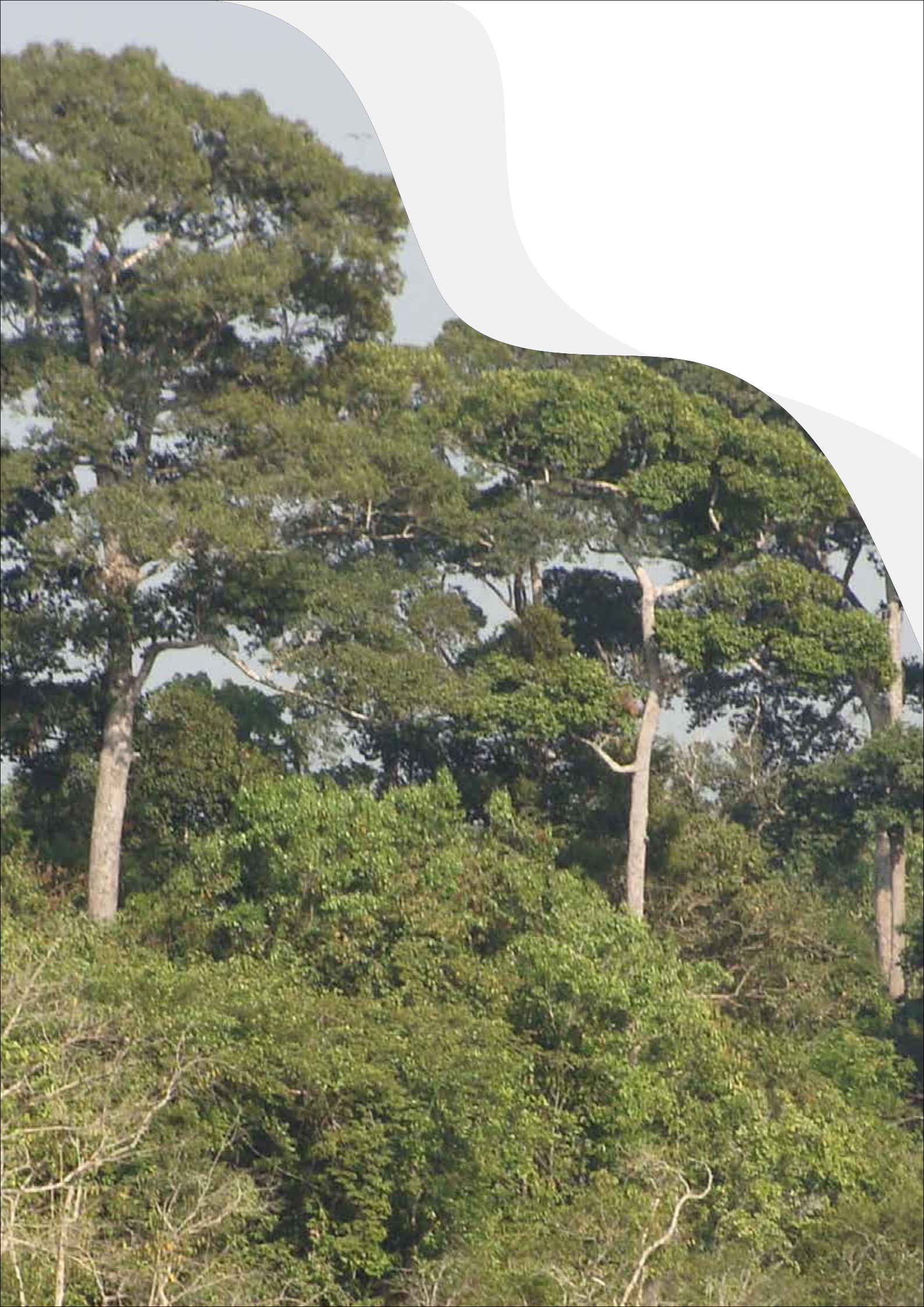
PAM 17 - Conservation of existing forests

The priority will be given to the Hill and Coastal zones for afforestation/ reforestation activities and to the Hill zone for restoration activities. The Hill zone alone represents 81.94% of reforestation potential in the country (needed to reach 16% of forest cover), 84.19% of the overall targets for enrichment plantation of degraded forests and 52.14% of the overall target for protection and conservation. Therefore, careful planning and stakeholder engagement in the Hill region are critical for the success of the Strategy. In this context, technical assistance project is recommended for the development of an 'Integrated REDD+ Sub-national Implementation Plan' for the important regions like Hill zone (including CHT).

Successful implementation of the BNRS will result in emission reduction of about 241 m tCO_2-eq. In addition, implementation of the BNRS will have positive socio-economic and environmental benefits, especially to women, from reduced indoor air pollution, reduced time for fuelwood collection, livelihood improvement through employment generation, etc.

The total cost of the PAMs is estimated at US$ 2,654 million. National and international funding sources will be accessed for investment of the strategy. The BRNS will be periodically reviewed synchronizing with updating of FRL.

The BNRS is structured to provide information on the REDD+ development process and the status of forests in Bangladesh (Part A), the vision of REDD+ in Bangladesh (Part B), what policies and measures will be implemented to achieve emission reductions and removals (Part C), how the BNRS and REDD+ elements will be coordinated (Part D) and cross cutting issues and enabling conditions (Part E). Detailed description of the PAMs is provided in Annex 1.



Part A

THE CONTEXT

THE CONTEXT

1.1. INTRODUCTION

1.1.1. International context to REDD+

Forests are one of the largest carbon sinks in the world. Deforestation and forest degradation result in releasing carbon dioxide (CO_2) into the atmosphere. World's forest area decreased from 31.6% to 30.6% between 1990 and 2015 (FAO 2018), with a majority of these loses occurring in tropical regions (FAO 2010; IPCC 2007). As such forestry sector is found to be responsible for nearly 12% of the anthropogenic Greenhouse Gas (GHG) emissions.[3]

To address emissions from the forestry sector, a result-based financing mechanism was developed under the United Nations Framework Convention on Climate Change (UNFCCC) and included in the Paris Agreement[4]. This mechanism aims to support the reduction of emissions from deforestation and forest degradation and promote the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries. This is known as REDD+. REDD+ aims to provide result-based payments to developing countries to contribute to mitigate climate change impacts through the following five activities:

1. Reducing carbon emissions from deforestation;
2. Reducing carbon emissions from forest degradation;
3. Conservation of forest carbon stocks;
4. Sustainable management of forests; and
5. Enhancement of forest carbon stocks.

[3] Climate Change 2014; Mitigation of Climate Change, IPCC Working Group III
[4] Agreement signed at COP 21 of the UNFCCC in Paris

The countries willing to implement one or combination of the above five activities to be eligible to obtain results-based payments are requested to develop the following four elements (as per the Cancun Agreements Decision 1/CP.16):

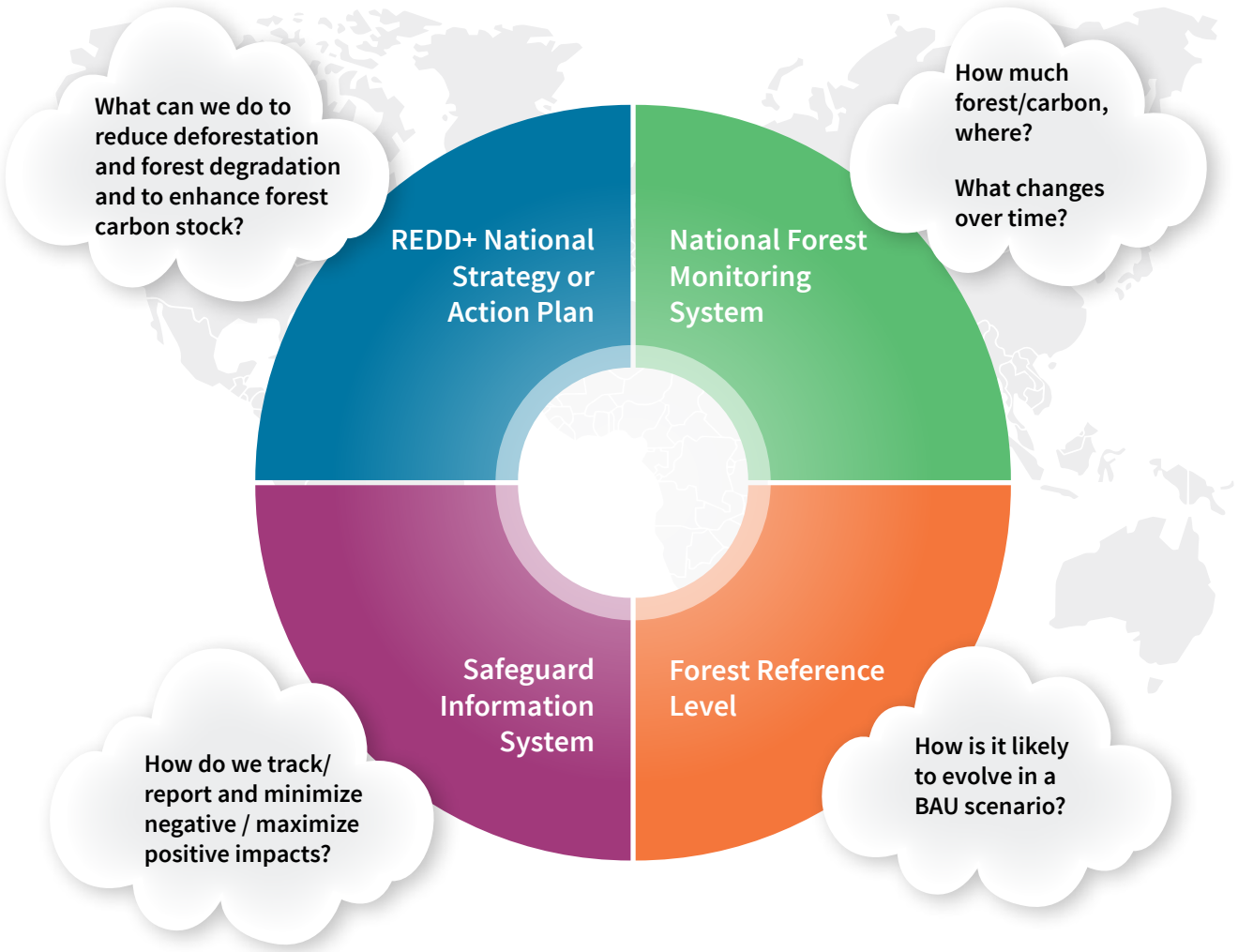


Figure 1: Four key elements of REDD+ under the UNFCCC

1.1.2. REDD+ in Bangladesh

People's Republic of Bangladesh has been a signatory to the UNFCCC since 1994. In August 2010, the Government of Bangladesh (GoB) became a partner country to the UN-REDD Programme. Bangladesh took several key steps to establish REDD+ (Figure 1) i.e., established the National REDD+ Steering Committee, prepared the REDD+ Readiness Roadmap, etc., and implemented two projects i.e., (1) the UN-REDD National Programme and (2) Strengthening national forest inventory and satellite land monitoring in support of REDD+ in Bangladesh (referred as NFI project).

Both projects were led by the Bangladesh Forest Department (BFD) under the Ministry of Environment, Forest and Climate Change (MoEFCC).

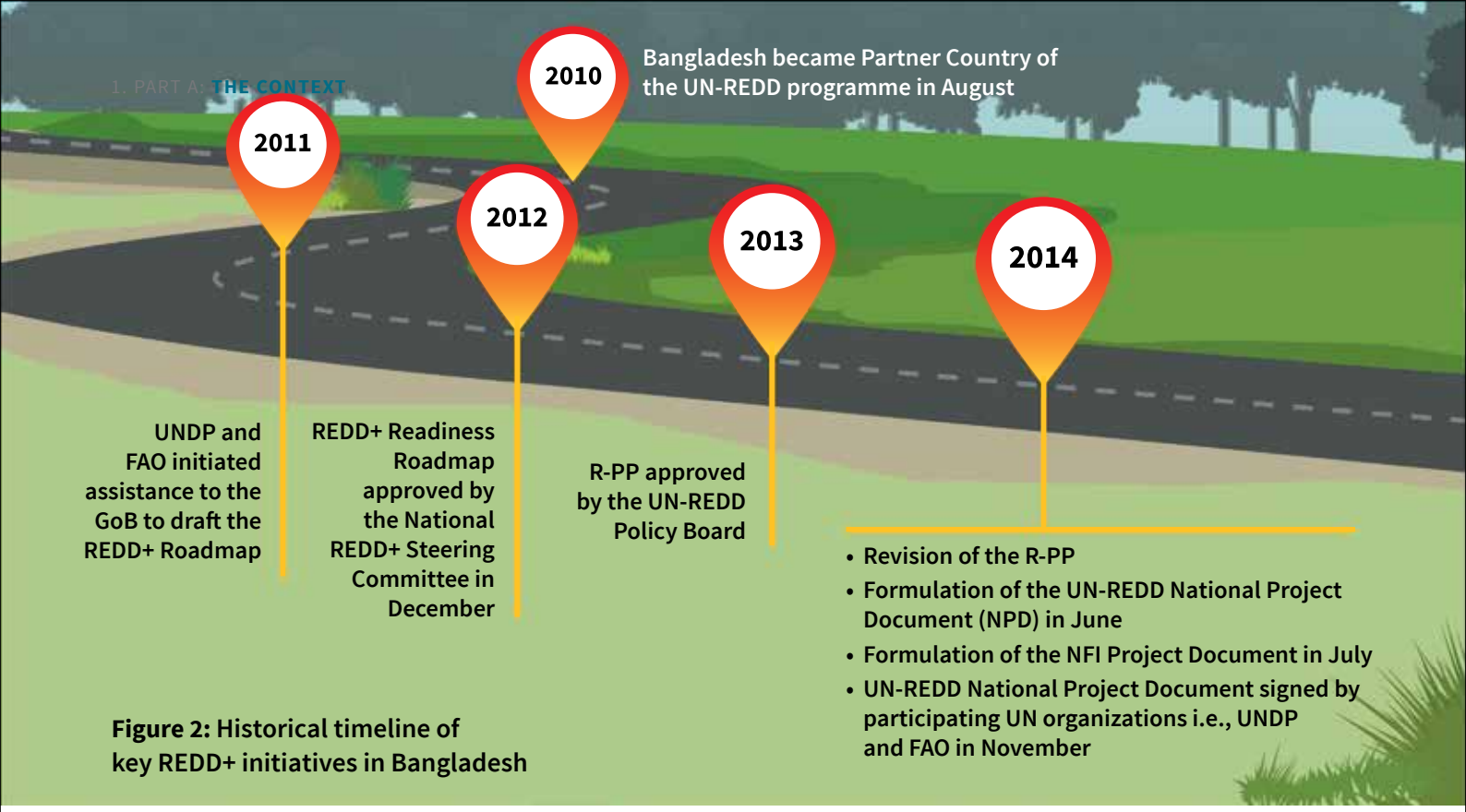


Figure 2: Historical timeline of key REDD+ initiatives in Bangladesh

The UN-REDD Bangladesh National Programme supported three of the four key elements of REDD+ under the UNFCCC, with by the end of REDD+ readiness phase, i.e. (1) the Bangladesh National REDD+ Strategy (BNRS), (2) the National Forest Monitoring System (NFMS) and (3) the Forest Reference Level (FRL).

The National Forest Inventory (NFI) project contributed to the NFMS and the SilvaCarbon programme supported the NFI project by providing targeted technical support in formulating the NFMS.

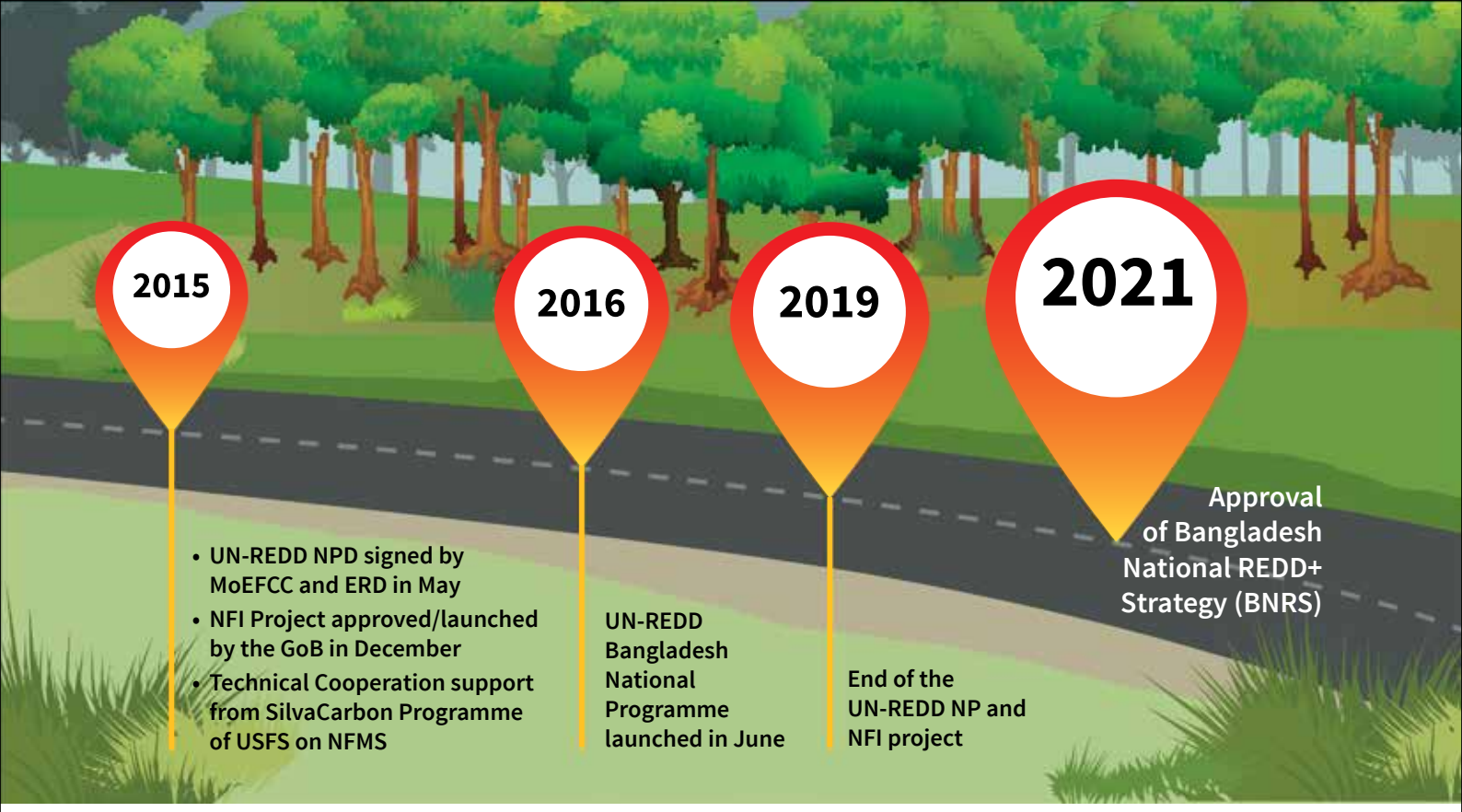
The country progressed on these three elements of the Warsaw Framework as follows:

Bangladesh National REDD+ Strategy: The Bangladesh National REDD+ Strategy (BNRS) provides information on what the country will do to achieve REDD+ objectives, and how it will implement REDD+. The BNRS is informed by lessons and good practices from several projects/programmes to facilitate coherence with and responsiveness to efforts undertaken by Bangladesh within the context of the forest sector. It draws on early experiences to present best practices and lessons learned from past initiatives to formulate and implement the PAMs (see Section 3.1 & Annex – 1). The PAMs showcases Bangladesh's best practices and lessons learned in six strategic areas which are essential for reducing deforestation and forest degradation and for enhancing forest carbon stock.

While the BNRS will promote discussions and synergies among Ministries and with other initiatives and strategic documents addressing issues not yet addressed in the BNRS, it follows a stepwise approach where the GoB decided to first focus on forest sector drivers of deforestation and forest degradation and interventions. The GoB envisages to widen the BNRS further in the future to include other sectors such as agriculture and land use planning.

National Forest Reference Level: The FRL is an assessment of trends in land use change over time and emissions from land cover change. It represents a baseline against which a country's performance in reducing emissions or increasing removals of GHG will be assessed. In addition, the FRL may also be used in the future for the purpose of obtaining results-based payments under REDD+, and can serve as a standard for forest monitoring and governance.

- The forest definition used for the construction of FRL is the FAO definition, which is adapted to include mangrove forest areas in Sundarban.
- Bangladesh has prepared its FRL focusing on three REDD+ activities: (i) Reducing emissions from deforestation, (ii) Reducing emissions from forest degradation and (iii) Enhancement of forest carbon stocks from afforestation/ reforestation and forest restoration.



- The carbon pools considered are above-ground and below-ground biomass, and CO_2 is the only GHG included for the construction of FRL. The historical reference period is 2000-2015.
- The scale is national level, but results are also reported separately for five zones of the country (Hill, Sal, Coastal, Village and Sundarban), that present very distinct forest dynamics. Emissions and removals associated with trees outside forest have been calculated but not accounted for the construction of FRL, as trees outside the forests do not meet the criteria of the definition of forest.

The GoB submitted its FRL to the UNFCCC in January 2019 and revised FRL accepted by the Technical Assessment Team in July 2019. Latest version is available on UNFCCC's website.

National Forest Monitoring System: The NFMS supports to monitor land use change, and links with a national forest inventory to provide information on emissions from the forestry sector. This element is fulfilled by the 'Bangladesh Forest Information System (BFIS)' which was launched in December 2018. The BFIS[5] is a web-based platform which includes different modules/tools for accessing, adding, and updating information related to forest resource management. Modules are organised according to four categories (1) development activities, (2) management and conservation, (3) forest assessment, and (4) knowledge management. The 'forest assessment' category includes the 'BFIS Geoportal' module to support the Satellite Land Monitoring System (SLMS) and the 'Bangladesh Forest Inventory' module to support the NFI and the 'Forest Emission Factor Database' module to support the GHG estimation for the forestry sector

Safeguard and Safeguard Information System (SIS): The SIS provides information on how the REDD+ safeguards are understood in the national context, and how they will be addressed and respected during implementation of the National REDD+ Strategy.

REDD+ Readiness support received by Bangladesh did not include technical assistance on safeguards. An initial study on Environmental Safeguard and Information System[6] has been completed and social safeguards have been partially analysed under the studies on (i) land tenure[7] and (ii) gender[8]. Similarly, preliminary evaluation of environmental and social risks of the REDD+ PAMs have been evaluated.

[5] http://bfis.bforest.gov.bd/bfis/
[6] http://www.bforest.gov.bd/site/page/5d40ef21-5f56-4933-af1d-5972252852f2/-
[7] http://www.bforest.gov.bd/site/page/5d40ef21-5f56-4933-af1d-5972252852f2/-
[8] http://www.bforest.gov.bd/site/page/5d40ef21-5f56-4933-af1d-5972252852f2/-

1.2. FOREST GOVERNANCE AND LAND USE

1.2.1. Ecosystems

The total forest land area of the country is 2,298,904 ha which accounts for less than 15.5% (MOEFCC 2018) of the total land area. The BFD manages 1,603,678 ha of forests and the remaining 695,226 ha is managed by Ministry of Land represented by the Deputy Commissioners of Chittagong Hill Tracts (CHT).

The forests of Bangladesh are broadly classified into (Table 1, Figure 3 and 4)

1) Hill forest,
2) Sal forest,
3) Natural mangrove forest (Sundarbans),
4) Coastal afforestation,
5) Freshwater swamp forest.

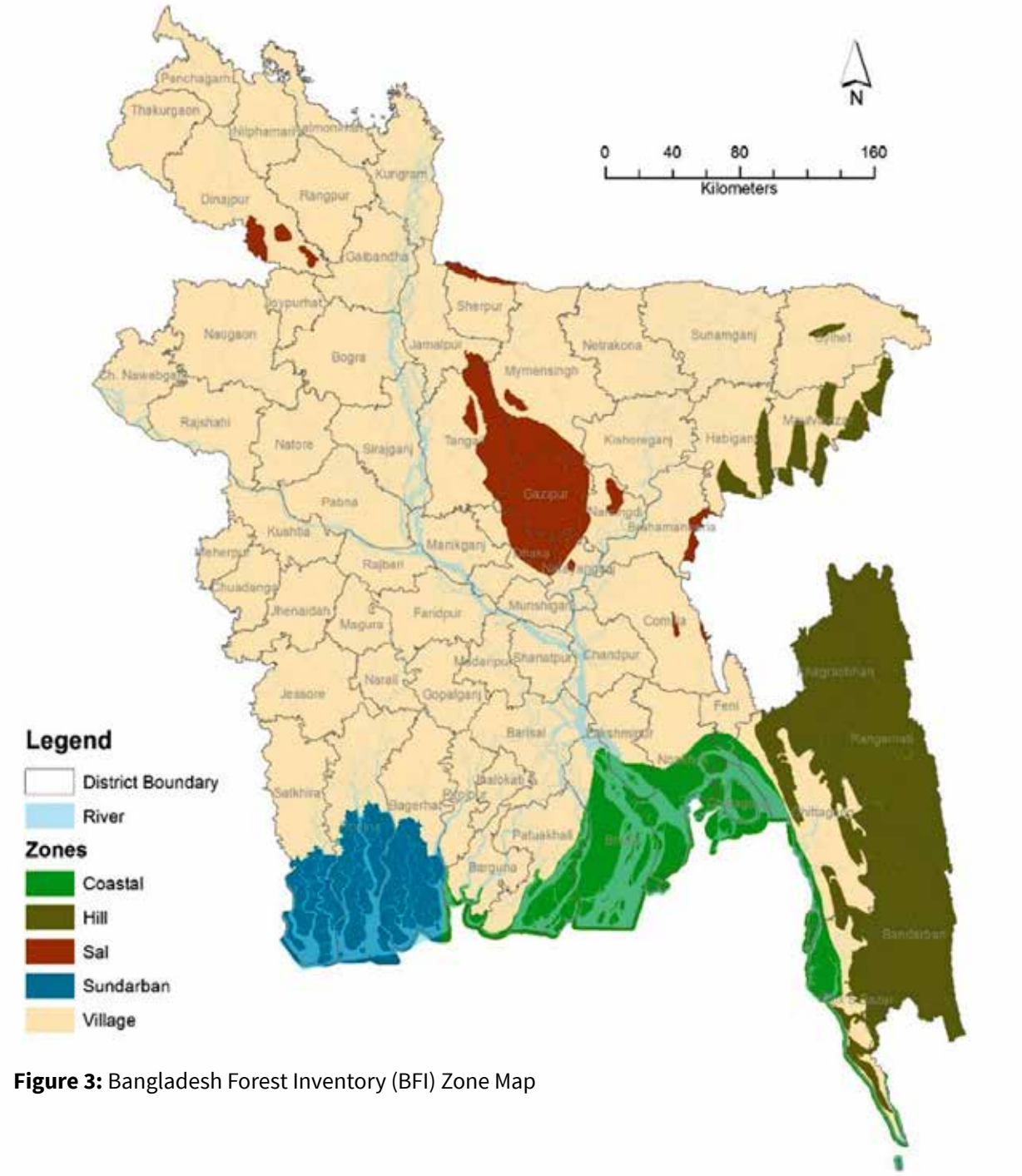


Figure 3: Bangladesh Forest Inventory (BFI) Zone Map

Hill Forests: Hill areas form about 12-15% of the country. The forests in this area are tropical evergreen and semi-evergreen with several subtypes based on altitude, soil, and rainfall. Tropical mixed evergreen forest is the most important type, with the dominant tree species, the Dipterocarps, being highly valued due to their high-priced timber. Common evergreen species include Dipterocarpus spp., *Swintonia floribunda*, *Artocarpus chaplasha*, *Hopea odorata*, and *Tetrameles nudiflora*.

Sal forests: The Sal forests are tropical moist deciduous forests located in central Bangladesh, north from Dhaka. 86% of the Sal forest is situated in the Districts of Gazipur, Mymensingh, Tangail and Comilla (central region), with the remaining 14% in the districts of Rangpur, Dinajpur and Rajshahi. Sal forests are dominated by Sal (*Shorea robusta*) and Sal associates namely – *Terminalia belerica*, *Dillenia pentagyna*, *Albizzia procera* and, *Lagerstroemia parviflora* etc. The forest resources are used by local people for firewood and the landscape is interspersed with low-lying agriculture areas.

Mangroves (Sundarbans): Most mangrove forests are in the southwest in the Sundarbans region, forming the largest mangrove forest in the world. The Sundarbans is a deltaic swamp formed by silt transported over time by the Ganges River system. The mangroves are dominated by *Heritiera fomes*, *Excoecaria agallocha*, *Ceriops decandra* and *Sonneratia apetala* along with another 24 species of mangrove, and there is a highly diverse fauna (840 species) and flora (334 species) on the area (Rahman et al. 2010), many of which are endangered. About 4 million people depend directly on mangroves for their livelihoods (Spalding et al. 2010), with 3.5 million of these relying on the Sundarbans area (Uddin et al. 2013).

Coastal afforestation: Coastal forests comprise planted mangrove and shoreline forests. This successful afforestation program began in 1966 and has continued since then to protect the population in the coastal areas from cyclones and storm surges, to stabilize newly accredited soil sediments and to provide wood products, protection from erosion, and to increase the potential of fishery related activities (Islam and Rahman, 2015, Siddiqi, 2001). Thirty-seven non-mangrove species have been planted on the slopes of embankments and roadsides under the Green Belt Project in 1995 and Coastal Embankment Rehabilitation Project in 1997 (Islam and Rahman, 2015). These species include timber, fuelwood and fruit tree species.

Fresh Water Swamp Forest: Freshwater swamp forests consist of flood-tolerant evergreen trees namely Hijal (*Barringtonia acutangula*) and Koroch (*Pongamia pinnata*). A fully developed stand exhibits a closed canopy with mature trees standing 10 to 12 meters tall. The swamp forests support freshwater fisheries.

In addition, there are tree resources outside forests mostly in settlements, commonly known as homestead forest, roadside strips, embankments and other marginal lands. There are 25.53 million homesteads in Bangladesh (BBS, 2011) which fulfil basic needs of the people providing food, fruits, shelter, cash, etc. Multi-layered vertical stratification, species diversity, and diversity of economic plants are characteristic features of Bangladesh homestead forests (Alam, 2008).

Table 1: Distribution of major forest ecosystem in Bangladesh

Forest Ecosystems	Location	Area (million hectares)
Under Management of Forest Department		
Hill Forest	Eastern part extending over Sylhet, Moulvibazar, Habiganj, Ragnamati, Bandarban, Khagrachari, Chittagong and Cox's Bazar	0.664 (29%)
Natural Mangrove (Sundarbans)	South-west in Khulan, Bagerhat and Satkhira	0.602 (26%)
Coastal Afforestation	Along the Coastal zone	0.20 (0.09%)
Sal Forest	Chiefly in the Central region in Gazipur, Tangail, Comilla, Sherpur and Mymensingh. Small patches occur in Dinajpur, Rangpur, Thakurgaon, Naogaon and Panchagarh in the north-west region	0.12 (0.05%)
Fresh water Swamp Forest	Mainly in Sylhet and Sunamganj district in the north-eastern part	0.023 (0.01%)

Forest Ecosystems	Location	Area (million hectares)
Managed by Ministry of Land (represented by Deputy Commissioner)		
Hill forest legally termed as Un-classified State Forest (USF)	Chittagong Hill Tract Districts of Rangamati, Khagrachari and Bandarban	0.713 (31%)
Total		**2.32**

Source: Adopted from "Thotho Konika: National Tree Plantation Campaign and Fair-2019, RIMS Unit and Management Plan Unit, Forest Department

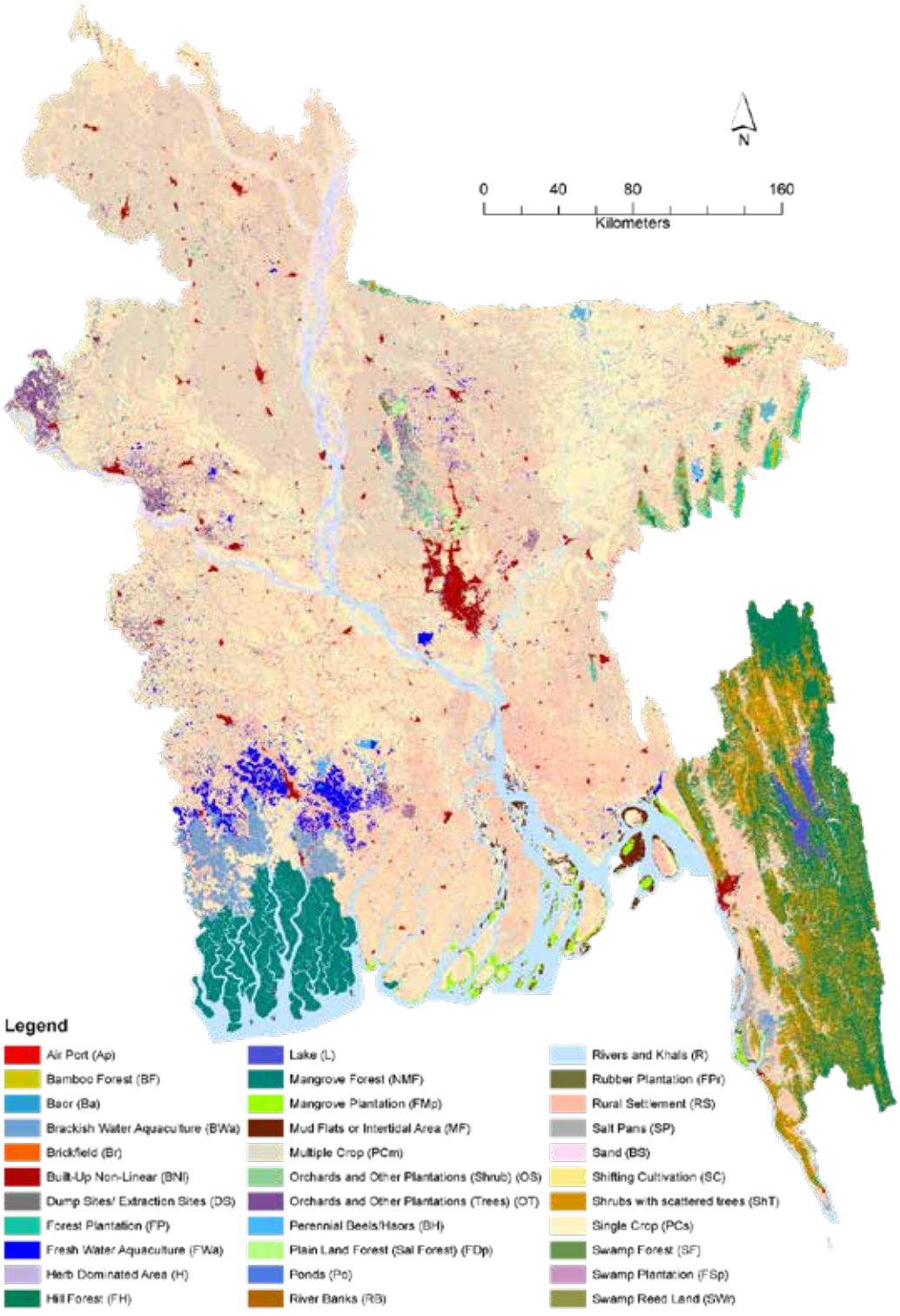


Figure 4: Land Cover Map 2015 of Bangladesh

1.2.2. Current Forest Management Practices

Management of forests in Bangladesh was once dominated by sustainable timber harvesting and has now transformed mainly into conservation, protection and plantation i.e., afforestation, reforestation and enrichment plantation, respectively in newly accreted land, deforested and degraded forests. To conserve the existing natural forest, the government has imposed a moratorium on tree felling in natural forests since 1990 and has since then focused its forestry activities on conservation, protection and plantation. This moratorium has been considered as a strategy to protect and conserve forests. However, a study (Sarker et. al., 2011) on existing logging bans in Bangladesh concludes that logging ban has not been able to contribute effectively in forest conservation. The study highlights five future directives which are also echoed in the BNRS: (i) continuation of bans in critical natural forests, (ii) reinitiating of management practices in the plantations, (iii) introducing multipurpose forestry in the protected area co-management systems, (iv) adoption of adaptive community-based forest management, and (v) ensure good forest governance.

Small-scale harvesting of NTFPs is permitted in Sundarbans Reserved Forest. About 53% of the total area (including waterways) of Sundarbans has been designated as Protected Areas for conservation of tiger population & other wildlife. Protection is mainly ensured through traditional patrolling, and in recent years, SMART[9] (Spatial Monitoring And Reporting Tool) patrolling was adopted in Sundarbans. Parts of Reserved Forests throughout the country declared as Protected Areas (national park, wildlife sanctuary, etc.) are conserved to protect wildlife and biodiversity within. Co-management is also practiced in some Protected Areas. The Social Forestry Program is practiced for increasing the tree cover in forested and non-forested landscape with the participation of the local poor people.

1.2.3. Institutional Setup

The BFD manages 'forest lands'[10] under different legal arrangements. According to the legal categorization, 'forest lands' are declared as reserved, protected, acquired, vested, and unclassified forests. The total area of 'forest lands' and its administrative/legal forest land's categories are shown in Table 2. However, this legal categorization does not consider land use/cover characteristics and, therefore, may include areas with no tree cover.

The BFD has a significant organisational network consisting of 9 circles, 41 divisions, 255 ranges and

Table 2: State-owned 'forest land' legal categorization

'Forest lands' by legal categories	Definition	Area in hectares (ha)	Remarks
Reserved forests	Everything is strictly prohibited unless otherwise permitted	1,818,219	Managed by Bangladesh Forest Department (BFD)
Protected forests	Everything is permitted except otherwise prohibited.	37,009	
Acquired and Vested forests	Prohibition of certain activities within privately owned lands or other lands for the protection of publicly owned forest, or for the protection of property and the environment.	11,579	
Unclassified State Forest (USF)	Depleted and denuded state-owned forests subject to various disturbances, particularly through shifting cultivation by tribal people.	17,353 695,226	Managed by Ministry of Land represented by Deputy Commissioners of Chittagong Hill Tract Districts
Total		**2,579,387***	

Note: this area includes all coastal land not yet fully accreted. Therefore there will be difference in area figures between Table 2 and Table 3. Source: RIMS Unit and Management Plan Unit, Forest Department.

[9] The SMART approach combines a cutting-edge biodiversity conservation management tool with capacity building and a set of best practices. The SMART software makes it possible to collect, store, communicate and analyse ranger-collected data on illegal activities, biodiversity, patrol routes, and management actions to understand where efforts should focus, and evaluate ranger performance. For more information, please refer to the official SMART website: http://smartconservationtools.org/

[10] In Bangladesh, 'forest land' is defined as a government-owned land.

672 beats offices. It has four wings namely - Planning, Forest Management, Education & Training and Social Forestry. Further, there are specialized units namely - Resource Information Management System (RIMS) Unit, Development Planning Unit, Monitoring Unit and Legal Unit. Up to March 2019, the total manpower strength of the BFD was 7,200 against an approved organogram of 10,499. The BFD has proposed a new organogram with a capacity of 17,500 which includes two additional units - NFI and Climate Change which will look after REDD+ activities in the department.

Apart from the state-owned forests, Bangladesh also has few private forests in hill regions. There are also lands with trees owned by different government agencies such as land located adjacent to railways (owned by the Bangladesh Railway), roadsides (Roads and Highways Department) and embankments (owned by the Bangladesh Water Development Board), that are not designated as 'forest lands.' Social forestry is generally practiced in these lands involving poor people.

1.2.4. REDD+ relevant acts, ordinances, regulations and policies

The legal entity and governance of 'forest lands' is established through gazette notifications under the Forest Act of 1927 (amended up to 2000) and other forest related acts, ordinances, regulations and policies. Some of the prevailing acts, ordinances, regulations and policies are:

- Forest Acts 1927 (amended in 2000)
- Forest Transit (control) Rules 2011
- Atia Forest Ordinance 1982
- State Acquisition and Tenancy Act 1950
- Private Forest Ordinance 1959
- Assam Forest Regulations 1891
- National Forest Policy 1994
- Moratorium on tree felling from natural forests (up to 2023)
- Social Forestry Rules 2004 (amended up to 2010)
- Environmental Conservation Rules 1997 (amended up to 2017)
- Environmental Conservation Act 1995 (amended up to 2002)
- Wildlife (Conservation and Preservation) Act 2012
- Biodiversity Act 2017
- Protected Area Rules 2017
- Brick Burning Act 2013
- The Forestry Sector Master Plan 2017-2031 (draft 2016)

1.2.5. Economic importance of the Forestry Sector

Bangladesh has made progress in reducing poverty, supported by sustained economic growth. The country aspires to become a middle-income country by 2024. In order to maintain the progress, the country is undergoing huge infrastructure, industrial investments and institutional transformations.

The forestry sector has been showing a constant growth rate of an average 5.4% in between 2009-2018 (Bangladesh Bank, 2019). The gross domestic product of forestry and related services at current prices in 2016-2017 was US$ 3,055 million representing 1.23% of the GDP (Bangladesh Bureau of Statistics 2018). However, the GDP contribution from forests (and forestry) could be underestimated, as some benefits from forests are accounted in other sectors (e.g. agriculture sector).

Majority of the rural population is directly or indirectly dependent on free access to natural resources for subsistence. For example, about 90% of rural people cook with solid[11] fuel (NIPORT, M&A and IFC International 2016). The Bangladesh Bureau of Statistics (BBS 2014) reported that 7,426,369 people were directly employed in the forestry sector in 2011-2012 of which 19% were women. The actual dependency in forests is underestimated due to the fact that this figure doesn't consider economic activities such as tourism and employment generated from extraction of fuelwood, wood products, thatching, medicinal herbs, and foods.

[11] wood, agricultural crops, animal dung, straw, shrubs, grass, and charcoal

1.3. DEFORESTATION, FOREST DEGRADATION AND ENHANCEMENT OF FOREST CARBON STOCK

1.3.1. Provision of the forest reference level

The Bangladesh FRL[13] (MOEFCC 2018) provides a detailed analysis of forest and tree cover change between 2000 and 2015 to estimate emission from deforestation, forest degradation and enhancement of forest carbon stock from afforestation/reforestation and forest restoration. The scale of the proposed FRL is national level but results are also reported separately for the five zones (Hill, Sal, Coastal, Village and Sundarban) of the country.

Estimated emission from the forestry sector of Bangladesh is 1,188,971 tCO_2e/year, and the removal from the atmosphere is -814,718 tCO_2e/year (Table 4). The net FRL is 374,253 tCO_2e/year. Emission mainly occurs in the Hill zone (85%), followed by the Sal zone (9%) and the Coastal zone (4%). Majority of removal is occurring in the Hill zone (52%), followed by the Coastal zone (35%) and the Sal zone (6%).

Only the Hill and Sal zones present net annual emissions during the FRL reference period, while the Coastal, Sundarbans and Village zones present net removals (Table 3). The Hill zone, with the highest emissions (85% of the total) but also by the highest removals 52% of the total), presents all characteristics to be the prime focus of the present BNRS, as reflected in the PAMs.

Emissions from deforestation and forest degradation account for 69% (819,814 tCO_2e/year) and 31% (369,117 tCO_2e/year) respectively of total emissions (Table 4). Removals of forest carbon stocks from forest restoration

Table 3: Emission and Removal (t CO_2e/year) in the five BFI zones and at national level

BFI zones	Emission	Removal	Net Emission	Ratio Emission/ Removal
	tCO_2e/year	tCO_2e/year	tCO_2e/year	
Hill	1,007,738	-427,688	580,050	2.36/1
Sal	112,710	-45,783	66,927	2.46/1
Coastal	44,547	-286,590	-242,043	1/6.43
Sundarbans	12,066	-23,499	-11,433	1/1.95
Village	11,957	-31,153	-19,196	1/2.61
National	1,188,971	-814,718	374,253	1.46/1

Source: MOEFCC 2018

Table 4: Emissions and removals (t CO_2e/year) from REDD+ activities at BFI zones and national level

BFI zones	Emissions and removals (tCO_2e/year)						
	REDD+ activity						Non-forest stable*
	Deforestation	Degradation High	Degradation Low	Enhancement			
				Afforestation/ Reforestation	Restoration High	Restoration Low	
Hill	750,878	136,134	120,726	-340,993	-62,742	-23,953	31,118
Sal	13,286	86,012	13,412	-10,121	-28,693	-6,969	23,658
Coastal	40,173	1,724	2,650	-38,841	-207,371	- 40,378	-75,216
Sundarbans	11,862	20	184	-4,844	-13,453	-5,202	-2,749
Village	3,697	7,284	976	-16,821	-12,131	-2,201	-449,336
National	819,854	231,175	137,942	-411,623	-324,390	-78,705	-476,084

*Emissions/Removals from non-forest stable (trees outside the forest) were not accounted for FRL
Source: MOEFCC 2018

Table 5: Deforestation and forest degradation in the BFI zones between 2000-2015

	Inventory Zones in Ha					Total
	Hill	Sal	Coastal	Sundarbans	Village	
Deforestation	134,447	2,080	11,715	2,363	1,306	151,912
Degradation	131,776	22,457	2,902	172	1,929	173,671
Total	280,657	24,537	14,617	2,536	3,235	325,583

Source: MOEFCC 2018

and afforestation/reforestation account for 49% (-403,095 tCO_2e/year) and 51% (-411,623 tCO_2e/year) respectively of total removals (Table 5). Removals from trees outside forest (non-forest stable) estimated at -476,084 tCO_2e/year for the reference period 2000-2015 but was not considered for the construction of the FRL (Table 4).

The Hill zone alone represent 92% of total emission due to deforestation and 70% of total emission due to forest degradation in the reference period.

These emissions correspond to a total deforested area of 151,912 ha (or 10,127.39 ha/year) and a total degraded area of 173,671 ha (or 11,578.06 ha/year) (Table 5).

Majority of the deforestation and forest degradation combined occurred in the Hill zone (86%), followed by the Sal zone (8%), the Coastal zone (4%) and the Sundarban (0.8%) and Village zone (1%) (Table 5). Both deforestation and forest degradation are high in the Hill zone, respectively 89% and 84%. While forest degradation is prominent in the Sal zone, deforestation is the major threat in the Coastal zone. In Sundarbans and Village zones, both deforestation and degradation are very low. This analysis will guide the geographical focus of the Policies and Measures (PAMs) identified 'Themes 1, 2, 3, 4 and 5' of the present national REDD+ strategy, with a priority given to the Hill, Sal and Coastal zones.

The land use change analysis provided in the Bangladesh FRL (Table 7) indicates that, in the Hill zone, most of the deforestation result in a conversion to shrubs with scattered trees (96.51%). This is the result of intensive and unsustainable fuelwood collection and timber harvesting, as described in the section below. In the Coastal and Sal zones, most of the conversion result into herbaceous crops, respectively 42.99% and 75.47%. This is the result of encroachment for agriculture, as described in the section below.

Table 6: Land use after deforestation between 2000 - 2015 in different BFI zones

Deforestation in Ha (figure in bracket is % of column total)						
Land use category	**Hill**	**Coastal**	**Sal**	**Sundarbans**	**Village**	**Total**
Orchards and Other Plantations (Trees)	170 (0.13)	1 (0.01)	163 (7.85)	-	19 (1.45)	354 (0.23)
Herb Dominated Area	-	-	-	-	-	-
Herbaceous Crops	2767 (2.06)	5036 (42.99)	1570 (75.47)	-	484 (37.06)	9,856 (6.49)
Mud Flats or Intertidal Area	-	911 (7.78)	-	146 (6,17)	16 (1.25)	1,073 (0.71)
Non vegetated	106 (0.08)	797 (6.80)	10 (0.47)	47 (1.97)	58 (4.43)	1,018 (0.67)
Rivers and Khals	687 (0.51)	3271 (27.92)		2,058 (87.07)	15 (1.14)	6,030 (3.97)
Rural Settlement	956 (0.71)	1666 (14.22)	131 (6.28)	-	57 (4.38)	2,810 (1.85)
Swamp Reed Land	-	-	-	-	141 (10.80)	141 (0.09)
Shrubs with scattered trees	129,761 (96.51)	3 (0.03)	131 (6.29)	-	513 (39.28)	130,407 (85.84)
Total	**134,447**	**11,715**	**2,080**	**2,363**	**1,306**	**151,911**

Source: MOEFCC 2018
Note: Herbaceous Crops denotes – single or multiple crops or crop land;
Herb dominated area denotes – grassland;
Non-vegetated area includes – aquaculture, baor, lake, beels, ponds, saltpan, sand, built-up non-linear area, artificial surfaces, brickfields, sand;
Shrubs with scattered trees: shrubs with scattered trees, orchard and other plantations (shrubs), shifting cultivation.

The analysis of removal (Table 4) indicates that afforestation/reforestation accounted for 51% of the total removals at the national scale, with higher historical results in the Hill zone (83% of total removals from afforestation/reforestation). Removals from restoration accounted for 49% of total removals at the national scale, with higher historical results in the Coastal zone (61% of total removals from restoration). Of total removals (afforestation/reforestation and restoration), the Hill zone contributed to 52%, followed by the Coastal zone (35%), the Sal zone (6%), the Village zone (4%) and the Sundarban zone (3%).

This analysis of historical trends combined with the analysis of opportunities for selected REDD+ activities in BFI Zones (Table 8) will guide the geographical prioritization of the PAMs under the 'Theme 6' of the present national REDD+ strategy, with a priority given to the Hill and Coastal zones for afforestation/reforestation activities and to the Hill zone for restoration activities.

At the national level, trees outside forest ('non-forest stable' column in Table 4) played a significant role in GHG removal between 2000-2015, with higher removal than afforestation/reforestation or restoration activities for the same period. The Village zone alone represents 91.54% of the removals from trees outside forests. Likewise, results indicate emissions from trees outside forests in the Hill and the Sal zones, depicting severe demand for fuelwood/timber.

This analysis will also guide the geographical focus of the PAMs under the 'Theme 1, 2 and 3' of the BNRS, with a priority given to the Hill, Sal and Village zones.

1.3.2. Drivers of deforestation and forest degradation

The study on drivers of deforestation and forest degradation in Bangladesh (Thompson et al 2017) indicates that at the national level, the major direct drivers of forest cover change are - illegal fuelwood collection and timber harvesting, encroachment for agriculture and settlement and incomplete forest management capacity. Low success rate of afforestation / restoration programmes is the main barrier to enhance forest carbon stock.

The PAMs identified in the BNRS are targeted to address the forest sector drivers of deforestation and forest degradation and the barriers to enhancement of the forest carbon stock.

A brief description of the direct and underlying drivers and barriers is given below:

Direct drivers of deforestation and forest degradation

Illegal fuelwood collection and timber harvesting
(Forest degradation leading to deforestation)

As per the Sample Vital Statistic Survey 2016 (BBS 2017), wood, bamboo and khari continues to be the major source of fuel at the household level in Bangladesh (more than 40%) with higher proportion in rural and forested areas. For example, above 50% of households in Barisal, Khulna and Sylhet division use fuelwood for cooking, respectively 41%, 32%, 32%, and 46% in Chattagram, Dhaka, Rajshahi and Rangpur.

While the demand for fuelwood has been constant in the past decade, there is currently a gap between demand and supply which has been increasing with the population growth and subsequent households, small businesses (bricks kilns and tobacco barns) and restaurants consumption (FAO 2015, Choudhury and Hossain 2011, FAO 2008). In villages, the supply trend is increasing for fuelwood and timber, but the high demand has created a situation of shortage (FAO 2008). Recently, fuelwood consumption in the displaced people camps has also created an additional source of demand.

There is also growing global demand for tropical wood products and the Bangladesh furniture industry exports about $50 million/year (Quamruzzaman 2014). The moratorium on tree felling in natural forests has not been effective to secure forest conservation. Weak law enforcement and the absence of alternative sustainable source of supply for good quality timber have inflated prices and indirectly encouraging illicit harvesting of timber species from natural forests.

Encroachment for agriculture and settlement
(deforestation and barriers to enhancement)

Between 2000-2015, about 6% of total deforestation was due to encroachment for agriculture (subsistence and commercial agriculture), industry and settlement (see Table - 7) – which resulted from a combination of underlying causes such as undefined land ownership

records (Jashimuddin and Suratuzzaman 2017), population growth, poverty and land shortage, reliance on agriculture commodities and growing market demand for agricultural commodities. Agriculture includes single or multiple crop agriculture, shrimp farming, commercial agriculture, banana plantation, betel nut cultivation, tobacco and root crops and shifting cultivation (in CHT).

Indirect drivers of deforestation and forest degradation

Poverty (barrier to enhancement)

Poverty is the main indirect driver, common to all forest types, and underlying all direct drivers. A recent study (CREL - BFD 2014) indicates an average yearly income per household in Sylhet, Khulna, Chattagram and CHT of BDT 76,941, BDT 44,730, BDT 81,000, BDT 65,852 respectively. These figures are even lower than the rural averages of these respective areas (BBS 2010).

Over population (barrier to enhancement)

Over population is the main underlying cause which catalyses this direct driver. As the population is likely to continue to grow, so will the demand for fuelwood and timber. In addition, the increasing demand of industry, lack of penetration of alternative fuel in rural areas, an increasingly global trade market and the desire for foreign capital contribute to increase illegal fuelwood collection and timber harvesting.

Inadequate forest management capacity and ineffective governance (barrier to enhancement)

Inadequate forest management capacity and ineffective governance results from a combination of land tenure issues related to forest lands, limited capacity of the BFD in terms of manpower resulting in weak monitoring and evaluation (M&E) and enforcement on the ground, weak interdepartmental cooperation/consultation, low engagement of communities.

Land tenure issues – The legal instruments designed to put the relevant policies into action remain vague and disjointed, leading to complications such as:

i. the legal process and procedure of the declaration of Reserved Forest lands remain incomplete;
ii. although lands have been assigned to the BFD on paper (i.e. khatian), forest lands have not been physically demarcated and specified;
iii. as a result, the BFD legal authority over the land is difficult to establish, and there are reported cases of lands being reassigned to other parties through the 'settlement' process;
iv. dissatisfaction over Reserved Forest declaration process in CHT after 1947 have also resulted in disputes over forest land;
v. the BFD lacks skilled manpower to fight encroachment and resolve complex land tenure cases.

Limited capacity of the BFD – Inadequate staffing, skill and capacity, absence of human resources / capacity development plan and funding to implement the Government programs have also been identified as indirect drivers (Khan 2018) and has resulted in ineffective M&E mechanisms and enforcement on the ground (especially field inspection). The BFD has not undergone significant institutional reforms to tackle changing socio-economic context and major forestry operations are project driven rather than long-term programmatic approach.

Weak interdepartmental cooperation/consultation – There are frequent examples and cases of inadequate and ineffective functional (intra and inter ministries) coordination among relevant government agencies indirectly resulting in deforestation and forest degradation (Khan 2018).

Low engagement of communities – The level of engagement of the beneficiaries of the Social Forestry programme and of the member of the co-management committees in the decision-making process and interaction with the BFD has been limited and needs further improvement. Members of communities, especially women, currently play a little role in the formulation of projects and in the key operational decisions and their engagement has mainly been in the forms of labour inputs to the plantation and associated physical activities (Khan 2018).

Drivers of deforestation and forest degradation in the Hill zone

Aside from illegal fuelwood collection and timber harvesting, which is common across Bangladesh, drivers of deforestation and forest degradation in the Hill zone include shifting agriculture, commercial agriculture such as fruit, tobacco and root crops, anthropogenic fire to clear and fertilise lands and cattle grazing.

While shifting agriculture was not a major issue in the past, ineffective governance, poverty, overpopulation (referred to as the common indirect drivers) and unclear land tenure have catalyzed clearing large areas and reducing the rotation age. At the same time, tobacco farming is spreading rapidly with an increased demand for fuelwood for leaf curing.

Drivers of deforestation and forest degradation in the Sal zone

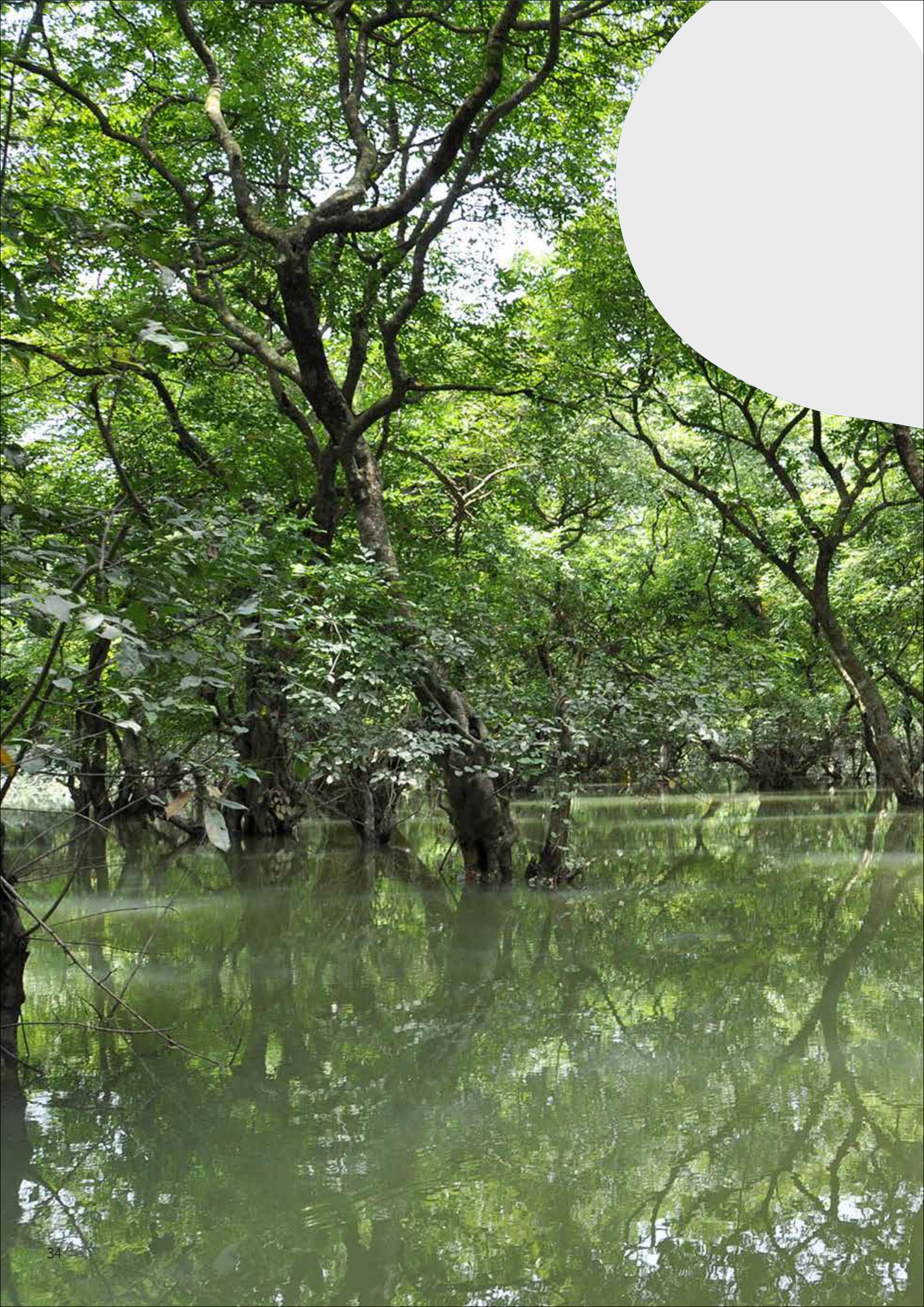
Aside from illegal fuelwood collection (for commercial use) and timber harvesting, which is common across Bangladesh, drivers of deforestation and forest degradation in the Sal zone include encroachment for settlements, industries and agriculture. In addition to the common indirect drivers, unclear land tenure, lack of available land (apart from forest land), corruption, and lack of education have catalyzed encroachments.

Drivers of deforestation and forest degradation in the Sundarbans

Forest degradation in the Sundarbans include pollution (from upstream industry, ship traffic, as well as from shrimp farms and agriculture), increased salinity (related to canopy thinning due to disease), reduced freshwater flows (as result of water diversions), and natural disturbances (cyclones).

Drivers of deforestation and forest degradation in the Coastal zone

Aside from illegal fuelwood collection (for commercial use) and timber harvesting, which is common across Bangladesh, drivers of deforestation and forest degradation in the Coastal zone include shrimp farming, agriculture, infrastructure development and natural disturbances (cyclones). In addition to the common indirect drivers, demand for seafood, lack of education on the importance of forests and unclear land tenure have catalyzed the direct drivers.



Part B

REDD+ VISION AND POLICY SYNERGIES

REDD+ **VISION AND POLICY SYNERGIES**

2.1 REDD+ VISION AND GOALS

The REDD+ Vision for Bangladesh draws on the analysis of the historical land use changes and the drivers of deforestation and forest degradation and on the alignment of REDD+ with key national development policies and international commitments. REDD+ is not meant to be a stand-alone strategy; but a vehicle to drive part of the country's overall developmental vision and pursuits. The vision is in line with Articles 2 and 3 of the UNFCCC, which underscores the importance of taking mitigation actions in ways that respect developing countries' priorities for poverty alleviation and social and economic development. These elements are brought forward in the **Bangladesh's REDD+ vision**:

'To facilitate and catalyze transformational change in the forest sector to lower GHG emissions, enhance conservation of biodiversity and ecosystems, sustain community livelihoods, and stronger long-term economic growth'

This vision will be realized by (i) creating the enabling conditions for implementing PAMs by key stakeholders – notably the government, civil society, academia, and the private sector; and (ii) mainstreaming the goals and approaches of the BNRS into the annual plans of all relevant sectors. This will drive actions at all levels towards reducing emissions and enhancing the country's forest cover.

The BNRS is not a new additional strategy but rather an overarching strategy that builds on, connects and create synergies across existing strategies and plans. In following this approach, the BNRS is expected to mainstream forest/ REDD+ objectives into cross-sectoral and sectoral strategies and plans to support the various sectors achieve their development targets in a way that reduces their impact on forests (i.e. reducing their 'forest footprint') and help deliver a transformational change for the country on the path towards a low emission green development regime.

REDD+ in Bangladesh will be implemented as a mechanism to induce transformational changes through increased support, collaboration and coordination among stakeholders by creating stakeholder platforms, through increased institutional capacity building across stakeholders and through ensuring increased transparency by accessibility to information on forests.

Through this, implementation of the BNRS will not only have a positive outcome in the forestry sector, but also help in achieving other sectoral/institutional goals with a lesser footprint on forests.

Overall goals of the strategy: Under the overarching vision that situates REDD+ within the broader context of Bangladesh's national development process, the goals of the BNRS to be achieved within 2030 are:

- Increased capacity for forest management;
- Improved livelihood of forest dependent communities;
- Increased forest cover to 16%;
- Reduced illegal encroachment in natural forests;
- Reduced pressure of fuelwood collection and timber harvesting in natural forests.

Contribution towards SDG Targets: The Government of Bangladesh wishes to increase its forest cover to 16%, from the current 14.5%. The BNRS (Thematic Area 6) will contribute towards achievement of this target, mainly through afforestation/reforestation activities in the Hill, Coastal and Sal zones, at the same time mitigating climate change. The BNRS contributes to SDG 13 (climate action) and SDG 15 (life on land).

Contribution towards NDC: Bangladesh's INDC (MOEF 2015) indicates specific mitigation objectives aligned with the BNRS. Specifically, the BNRS will support the following NDC objectives:

- Provide support to scale up afforestation and reforestation (Thematic Area 6);
- Maximize the use of renewable energy sources to lower GHG emission and ensuring energy security (Thematic Area 2);
- Ensure energy secure and low-carbon development of the economy (Thematic Area 1);
- Continuation of coastal mangrove plantation (Thematic Area 6);
- Continuation of Social and Homestead forestry (Thematic Area 2 and 3).

Tree resource development: Trees outside forests play a significant role in meeting fuelwood/timber demand as well as in GHG removal. The BNRS (Thematic Area 2 and 3) will support efforts to reach the Government commitment to increase tree cover from 22% to 24% by 2022 and therefore reduce pressure on natural forests.

Action Plan for Clean Cook Stove: The BNRS (Thematic Area 1) will contribute towards achievement of targets of the action plan undertaken by the SREDA and IDCOL.

Phase out of fired bricks in government constructio: Government has decided to phase out use of fired bricks by non-fired bricks by 2025 in all government construction (except for brick chips used in road construction). In addition, the Government will set financial incentive mechanisms in order to encourage private sectors to use non-fired bricks.

Digital land management: Government has already taken initiatives to remove complexities in land registration, transfer and other land-related issues. The BNRS (Thematic Area 4) will contribute to one priority sector and update land records through collaboration with the Ministry of Land (MoL). This will reduce land related disputes and encroachment and support achievement of the MoL targets.

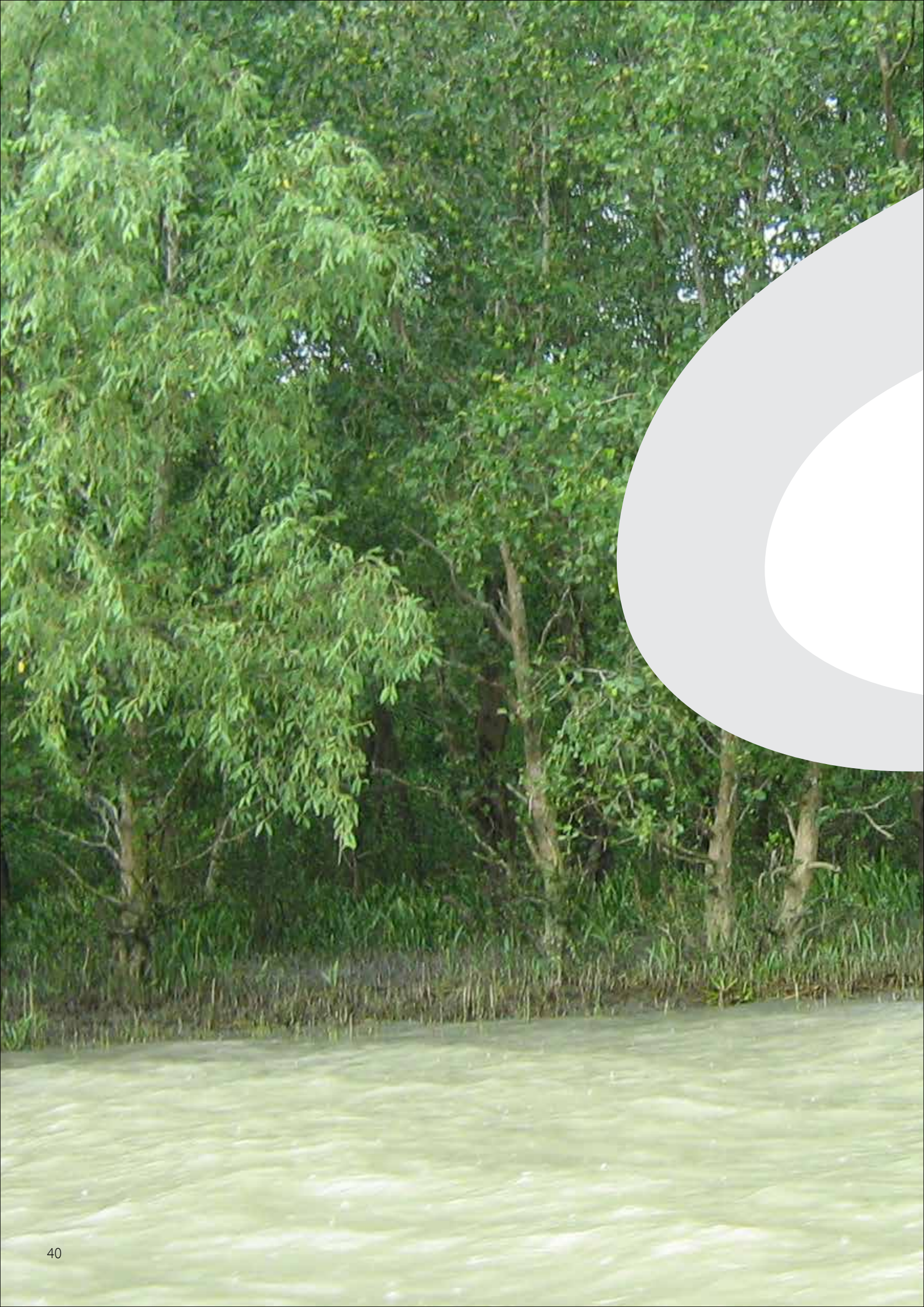
2.2. SYNERGIES WITH NATIONAL POLICY FRAMEWORK AND PAST EXPERIENCES

The BNRS is aligned with key policies and long-term strategic documents especially the Seventh (7th) Five Year Plan (GOB 2015), the Bangladesh Country Investment Plan (for Forestry, Environment and Climate Change (MOEFCC 2017), the Bangladesh Climate Change Strategy and Action Plan 2009 (MOEF 2009), and the drafted National Forest Policy, Forestry Master Plan, and the National Conservation Strategy (NCS).

All key policy documents include common actions that support the reduction of deforestation and forest degradation – such as the moratorium on felling in the natural forests (till 2022), the meaningful involvement of the local population in resource management, the creation of livelihood opportunities, the horizontal expansion of tree cover by promotion of social forestry activities, the completion of forest land survey and records, the protected area management, the development of a monitoring, reporting and verification system, etc. with regard to enhancement of forest carbon stock, the same policy documents supports afforestation/reforestation and enrichment (restoration) of degraded forests.

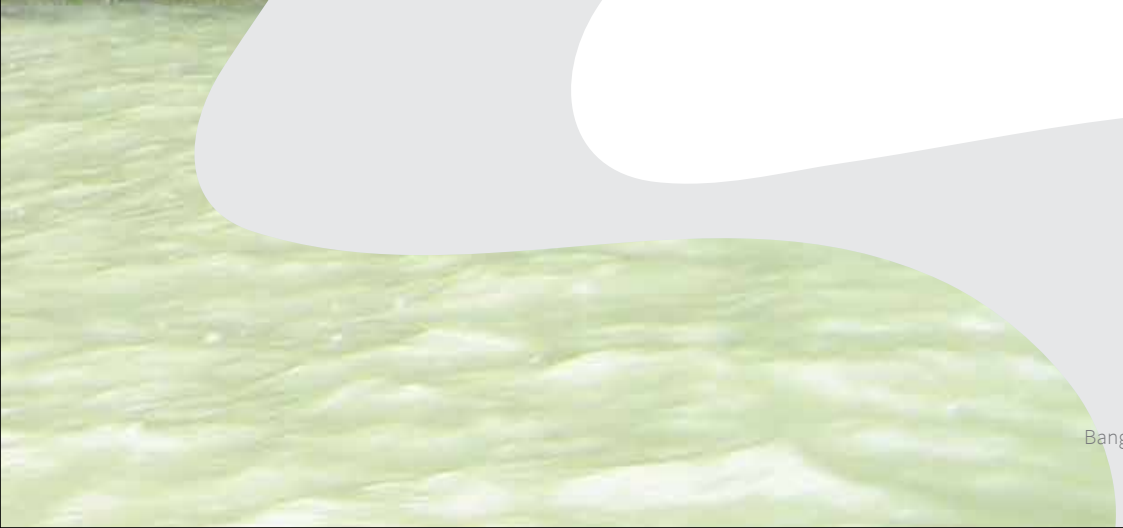
The Bangladesh Country Investment Plan for Forestry, Environment and Climate Change (MOEFCC 2017) also supports small and medium forest enterprise and value chain development and enhancement of the BFD's planting capacity. All the upcoming revision of key national documents such as the National Forest Policy and National Conservation Strategy further supports to develop a monitoring, reporting and verification system and engaging NGOs for awareness building, training and stakeholder group formation, to meet the widening gap between demand and supply of forest produce and to support law enforcement to reduce encroachments.

Similarly, the BNRS draws on early experiences and presents best practices and lessons learned from past/ongoing projects/programmes. For example, the stakeholder engagement mechanism that was developed under the Social Forestry programme will be used to manage tree resource generation outside the forested areas. The co-management experiences based on Nishorgo Supported Project (2004-2008), Integrated Co-management Protected Area project (2008-2012), Climate Resilient Ecosystem and Livelihood Project (2012-2018) pave the way for further stakeholder engagement in natural forest management. The Climate Resilient Participatory Afforestation and Reforestation Project (2013-2016) have had successful resilient plantation programs, and CHT Watershed Co-Management Activity has supported 1,445 ha of plantation in reserved forests. Key lessons of the GIZ supported Management of the Sundarbans Mangrove Forests were also purposeful in developing the BNRS. Finally, the on-going Sustainable Environment and Livelihood Project (2018-2023) is largely supporting REDD+ activities - reducing deforestation and forest degradation and enhancement of forest carbon stock through its afforestation, reforestation, and enrichment programme and strong collaborative management mechanism.



Part C

REDD+ POLICIES AND MEASURES AND EXPECTED RESULTS



REDD+ POLICIES AND MEASURES AND **EXPECTED RESULTS**

3.1 REDD+ PAMs

To realize Bangladesh's REDD+ vision and goals and to effectively address key drivers of deforestation and forest degradation, the BNRS aims to implement 17 PAMs under two Strategic Areas – reduce deforestation and forest degradation and enhance forest carbon stock – divided into in six Thematic Areas (Table 9):

1) Promote supply of alternatives energy, energy efficient technologies and timber substitutes;
2) Increase fuelwood supply in forested Districts;
3) Improve livelihoods of forest dependent communities;
4) Resolve forest land tenure issues;
5) Improve institutional capacity; and
6) Reforest/Afforest, restore and conserve.

These thematic areas are by no means mutually independent, and thus effective cross-sectoral coordination is essential to ensuring and maximizing their collective outcomes. The PAMs, which are described in Annex - 1: PAMs, have been identified through extensive consultations from grass root to national level between 2015-2018 (Annex – 2: Summary of consultations for developing the BNRS). During the readiness phase, a series of baseline and feasibility studies were conducted through consultative and inclusive processes. Such studies and stakeholder consultation input have informed the policy objectives, measures, and actions and provided the necessary contexts for establishing the key REDD+ design elements.

Table 7: Strategic areas, thematic areas and PAMs

Strategic Areas	Thematic Areas	PAMs
Reduce deforestation and forest degradation	Promote supply of alternate energy, energy efficient technologies and timber substitutes	PAM1 - Promotion of clean cooking & other devices to households, small businesses and institutions
		PAM2 - Emergency supply of LPG cooker to forcibly displaced Myanmar citizen camp
		PAM3 - Sustainable supply of alternative fuel and environment friendly technology including non-fired brick manufacturing for replacing traditional bricks kilns
		PAM4 - Sustainable supply of alternative fuel for tobacco curing
		PAM5 - Increase the use of processed timber, laminated wood, cane, bamboo and rattan products
	Increase fuelwood supply in forested Districts	PAM6 - Establish structures (nurseries & tissue culture facilities) for increasing fuelwood seedlings stock
		PAM7 - Establish fuelwood plantation on marginal land under the social forestry programme
		PAM8 - Promotion of integrated homestead forestry models
	Improve livelihoods of forest dependent communities	PAM9 - Scale-up alternative income generating activity for forest dependent communities
		PAM10 - Collaborative and sustainable management of NTFPs
	Resolve forest land tenure issues	PAM11 - Modernization of forest land management system
		PAM12 - Resolution of forest land related cases
		PAM13 – Improvement of forest land management system
	Improve institutional capacity	PAM14 - Increase capacity of the BFD through recruitment and targeted trainings
Enhance forest carbon stock	Reforest/Afforest, restore and conserve	PAM15 - Reforestation of deforested lands and afforestation of newly accreted coastal lands
		PAM16 - Enrichment plantation of degraded forest land
		PAM17 - Conservation of existing forests

Strategic Area 1

REDUCE DEFORESTATION AND FOREST DEGRADATION

THEMATIC AREA 1:
Promote supply of alternatives energy, energy efficient technologies and timber substitutes

Fuelwood demand for cooking is historically the main driver of deforestation and forest degradation. Adding to the sudden surge of fuelwood demand for refugee camps, it is critical to provide clean cooking stoves and alternative cooking fuels at large scale. The targets are to support adoption of LPGs to 6,500,000 units to poor households (of which 2,000,000 in the Hill zone), 10,000 units to institutions i.e., restaurants, mess, hostels (of which 5,000 in CHT) and as well as LPG cookers for all forcibly displaced Myanmar Citizen households in camps (209,225 - as per UNHCR[12] January data).

In Bangladesh, almost all brickfields in rural areas also use fuelwood and are mostly situated near forested areas. The country produces over 8.66 billion bricks a year and the sector has grown at 5.3% over the last decade. The target is to promote 830 brick kilns (778 VSBK and 52 non-fired brick kilns) with environment friendly technology to supply bricks produced by 1,252[13] brickfields currently (out of a total 4,520 in forested areas).

Similarly, wood is the main fuel for tobacco leaves curing. Tobacco plantations are spreading in the Hill areas of Chattagram and in the Chittagong Hill Districts and will impact on natural forests and homestead vegetation if alternatives are not promoted. There are about 5,000 tobacco barns in the Chattagram Division. The total fuelwood consumed per year is around 35,000 tons. The target is to promote 200 briquette making enterprises to meet fuel demand for 5,000 barns for tobacco curing.

The moratorium on felling in the natural forests combined with the absence of a sustainable source of supply and high prices have increased illicit timber harvesting. The target is to increase the use of processed timber and laminated wood to decrease the demand for solid wood.

SPECIFIC PAMS:

PAM 1: Promotion of clean cooking stoves & other devices to households, small businesses and institutions

PAM 2: Emergency supply of LPG cooker to Forcibly displaced Myanmar citizens camp

PAM 3: Sustainable supply of alternative fuel and environment friendly technology including non-fired brick manufacturing for replacing traditional bricks kilns

PAM 4: Sustainable supply of alternative fuel for tobacco curing

PAM 5: Increase the use of processed timber, laminated wood, cane, bamboo and rattan products

Expected emission reduction under 'Thematic area 1' = 94.75 $MtCO_2eq$.

THEMATIC AREA 2:
Increase fuelwood supply in forested Districts

As explained above, fuelwood demand is historically the main driver of deforestation and forest degradation. While the demand for fuelwood has been constant, there is a gap between demand and supply which has been increasing with the increase of population, resulting in intensive and unsustainable fuelwood collection.

The target is to increase availability and quality (i.e., fast growing, high calorific value) of fuelwood seedlings (through conventional nurseries and tissue culture), to develop alternative fuelwood sources outside natural forest (10,000 km of strips) and to develop integrated forestry models (incl. alternative fuelwood sources) at the homestead level (700,000 households).

SPECIFIC PAMS:

PAM 6: Establish structures (nurseries & tissue culture facilities) for increasing fuelwood seedlings stock

PAM 7: Establish fuelwood plantation on marginal land under the social forestry programme

PAM 8: Promotion of integrated homestead forestry models

Expected emission reduction under 'Thematic area 2' = 4.64 $MtCO_2eq$

[12] https://data2.unhcr.org/en/situations/myanmar_refugees

[13] These are non-environment friendly brick kilns as per database (accessed July 2019) available with Air Quality Management Unit, Department of Environment.

THEMATIC AREA 3:
Improve livelihoods of forest dependent communities

Communities living around forested areas are generally poor, resulting in pressure on natural resources like forests to meet basic needs (e.g. fuelwood, NTFPs, etc.).

Many government programmes and projects are targeting poverty reduction and improvement of livelihood of poor rural communities. Through enhanced coordination among government agencies, additional resources can be streamlined towards forested Districts and leading to enhanced socio-economic impacts on forest dependent communities and achievement of sectoral targets. It is acknowledged that livelihood activities are unlikely to have a positive impact on forests alone if other PAMs are not implemented simultaneously.

The targets are to support at least 500,000 poor households (with emphasis on CHT) with Alternative Income Generating Activity (AIGA), e.g. through improved accessibility to government programmes and to support community engagement in forest management through establishment of sustainable integrated NTFPs production in buffer areas.

SPECIFIC PAMS:

PAM 9: Scale-up alternative income generating activity for forest dependent communities

PAM 10: Collaborative and sustainable management of NTFPs

Expected emission reduction under 'Thematic area 3' = 4.82 $MtCO_2eq$

THEMATIC AREA 4:
Resolve forest land tenure issues

In the 1950s when forest labour was in serious shortage, the BFD established "Forest Villages" in reserved forest areas, whereby each family was given land for homesteads and agriculture. Over the years, the population increased and so did the area of villages. Inheritance of land ownership needs to be resolved and village areas need to be demarcated to reduce risks of encroachments.

Similarly, absence of documents and conspicuous demarcation of forest lands and lengthy procedure of disposing up of land related cases in the courts encourage unauthorized and illegal encroachment into forest lands. To date, reservation of about 486,750 ha of forest is incomplete i.e., have not been declared under section 4 and 6 of the Forest Act 1927.

There are about 2,900 forest land related cases and 232 land related writ petitions (up to March 2019). Unless coordinated actions are taken to accelerate the reservation process and resolve these cases, forest management activities cannot be implemented in these areas.

Similarly, existing mechanism for coastal forests land development and transfer of newly accreted lands favours deforestation and forest degradation. Improved coordination and joint assessment are necessary before transferring the land ownership from the FD to the Ministry of Land.

The targets are to survey and demarcate 1,000,000 ha of forest land, to resolve land ownership within 'Forest Villages', to resolve forest land related cases and writ petitions, to complete 486,750 ha of reservation and to improve the coastal forest land development and transfer mechanism.

SPECIFIC PAMS:

PAM 11: Modernization of forest land management system

PAM 12: Resolution of forest land related cases

PAM 13: Improved forest land management system

Expected emission reduction under 'Thematic area 4' = 2.05 $MtCO_2eq$ (to avoid double counting with PAM-17, this figure has not been used in total emission reduction).

THEMATIC AREA 5:
Improve institutional capacity

Over 50% of the senior positions in the BFD are vacant. With large-scale retirements taking place in the next 2/3 years there won't be enough trained professionals to carry out the job. Above reason and existing limited

budget lead to ineffective activities in the field. Similarly, the BFD has not undergone significant institutional reforms to tackle changing socio-economic and environmental conditions in the country and major forestry operations are project-based rather than long-term programmes. This thematic area will be supported by building institutional capacities for the management of the BNRS and by strengthening communication and advocacy towards behavioural changes and adoption of technology (see Part E).

The targets are to recruit 2,386 officials under the existing organogram, 7,676 officials periodically under the proposed organogram (17,800) and to organize skills development training programs for 5,275 officials.

SPECIFIC PAMS:

PAM 14: Increase capacity of the FD through recruitment and targeted trainings

Strategic Area 2

ENHANCE FOREST CARBON STOCK

THEMATIC AREA 6:

Reforest/Afforest, restore and conserve

Bringing up the forest cover to 16% corresponds to the afforestation/ reforestation of 637,259 ha of forest lands. Moreover, 173,671 ha of degraded forest need enrichment planting and 323,047 ha out of 1269,070 ha require strengthened conservation and protection measures to avoid deforestation and degradation from business-as-usual scenarios. Afforestation, reforestation and restoration activities often lack quality seedlings, decreasing impacts of such activities. The targets are provided in table 9:

The priority will be given to the Hill and Coastal zones for afforestation/ reforestation activities and to the Hill zone for restoration activities. The Hill zone alone represents 81.94% of reforestation and/or restoration potential in the country (needed to reach 16% of forest cover) of which CHT is a major part (Table 9). Similarly, the Hill zone represents 84.19% of the overall targets for enrichment plantation of degraded forests and 52.14% of the overall target for protection and conservation.

Therefore, careful planning and stakeholder engagement in the Hill region and other areas are critical for the success of the Strategy. In this context, as an example, a technical assistance project is recommended for the development of an 'Integrated REDD+ sub-national implementation plan for the Hill Region' (including CHT) and is described in Annex – 1. Such projects can be replicated for other areas like Sal and Coastal zones as well.

SPECIFIC PAMS:

PAM 15: Reforestation and/or restoration of deforested lands and afforestation of newly accreted coastal lands

PAM 16: Enrichment plantation of degraded forest land

PAM 17: Conservation of existing forests

Expected emission reduction under 'Thematic area 6' = 135.79 $MtCO_2eq$. Total expected emission reduction under all thematic areas = 241 $MtCO_2eq$

Table 9: Various types of REDD+ activities in BFI Zones

BFI Zones	Total Restoration & Reforestation (ha)	Total enrichment plantation (ha)	Requires protection & conservation to avoid deforestation and forest degradation (ha)	Forest remaining as Forest under regular management	Forest land under various REDD+ activities (ha)
Hill	522,158	146,210	280,657	381,046	1,330,070
Coastal	111,715	2,902	14,617	111,046	240,281
Sal	2,080	22,457	24,537	3,631	52,706
Sundarban	-	172	-	438,834	439,006
Village	1,306	1,929	3,235	11,467	17,936
Total	**637,259**	**173,671**	**323,047**	**946,024**	**2,080,000**

3.2. THEORY OF CHANGE

Figure 4 shows how the above-described PAMs will work to address the drivers and underlying causes of forest change to achieve Bangladesh's REDD+ vision and goal. The implementation of the BNRS will build on existing best practices and baseline investment activities in relevant areas by public, private and international development partners (see 'REDD+ finance'). It is to be noted that for the PAMs to be successful, political conditions in CHT need to be favorable. The Chittagong Hill Tracts Peace Accord signed in 1997 has paved the way for development in the area. However, more stability is necessary. Such favorable conditions are necessary to increase confidence of the investor, government or international entities.

Table 5: Theory of change of the national REDD+ strategy

BANGLADESH NATIONAL REDD+ STRATEGY IMPLEMENTATION 2016 – 2030

OPERATIONALISE REDD+ ELEMENTS (FRL, NFMS, SIS, SOI)

Vision	Long term	To facilitate and catalyze transformational change in the forest sector with lower GHG emissions, stronger long-term economic growth, sustained community livelihoods, and effective conservation of biodiversity and ecosystem				
Goals	Emission Reduction of 241 MtCO2eq	Increased capacity for forest management Increased livelihood of forest dependent communities Increased forest cover to 16% Reduced illegal encroachment into natural forests Reduced pressure of fuelwood collection and timber harvesting in natural forests				
Theme	Promote supply of alternatives energy, energy efficient technologies and timber substitutes	Increase fuelwood supply in forested Districts	Improve livelihoods of forest dependent communities	Resolve forest land tenure issues	Improve institutional capacity	Reforest/Afforest, restore and conserve
PAMs	• PAM 1: CCS to households and business • PAM 2: CCS to Myanmar Camps • PAM 3: Sustainable fuel and technology for brick kiln • PAM 4: Alternative fuel for tobacco curing • PAM 5: Promotion of timber substitute	• PAM 6: Structures for increasing fuelwood stock • PAM 7: Fuelwood plantation in non-forest lands • PAM 8: Integrated homestead forestry models	• PAM 9: Scale-up AIG and livelihood programmes for forest dependent communities • PAM 10: Collaborative and sustainable management of NTFPs	• PAM 11: Modernization of forest land management • PAM 12: Resolution of forest cases • PAM 13: Improved forest land administration system	• PAM 14: Increase capacity of the BFD	• PAM 15: Reforestation and afforestation • PAM 16: Restoration and enrichment plantation of degraded forests • PAM 17: Conservation and protection of existing forests
Enabling conditions	- Applied research programmes on alternative energy and devices, fuelwood species, wood products durability, - Effective communication towards behavioral change and adoption of technology - Increased institutional capacities to ensure smooth implementation of the National REDD+ Strategy. - Informed and targeted identification of households (especially women) and forest dependent communities - Political support and favorable security condition in the country, particularly in CHT					
Underlying causes	- Population growth and household, small business and restaurant wood consumption - Wood consumption in forcibly displaced camps - Fuelwood consumption for bricks kilns and tobacco barns - Absence of sustainable supply of timber and high prices	- Population growth, poverty and land shortage - Reliance on agriculture commodities - Growing market demand for agricultural commodities	- Weak capacity of the BFD (HR, M&E, enforcement) - Land tenure issues related to forest lands - Weak interdepartmental cooperation/consultation - Low engagement of communities	- Limited engagement of communities in forest management - Lack of investment in the forestry sector - Slow progress of peace building in CHT region - Lack of consistent approach on identifying areas for rehabilitation - Lack of site mapping and species matching - Low quality of seedlings - Lack of post planting management		
Barriers & Drivers	Illegal fuelwood collection and timber harvesting	Encroachment for agriculture and settlement	Incomplete forest management capacity	Low success rate of afforestation / restoration programmes		
	Reduce deforestation and forest degradation			Enhance forest carbon stock		

3.3. FINANCE FOR REDD+ IMPLEMENTATION

Government in the past has funded activities like that of the PAMs. However, under BNRS, financing will take a more focused approach. The total cost of the PAMs is estimated at US$ 2,654 million (Table 10):

- Strategic area 1 = US$ 1,020 million (38%)
- Strategic area 2 = US$ 1,634 million (62%)

A mix of national and international sources will be targeted to reach the estimated cost. For example, national institutions already supporting the Strategic Areas and those identified as PAMs' implementers will refocus their operations on the 35 forested Districts. For example, IDCOL and SREDA supported by the Power Division, under Ministry of Power, Energy and Mineral Resources will prioritize the 3 hill districts of CHT, Chattagram and Cox's Bazaar and the Bangladesh Bank will continue its support to the brickfields located in the forested Districts. Similarly, the BNRS provides opportunities to align existing or upcoming Initiatives/Programmes/Projects that are relevant to REDD+ (i.e. that could either support REDD+ objectives or go against them) for them to support (or hinder less) REDD+ objectives.

Such reallocation/alignment of resources will help to reach the target .

On the other hand, the national budget for the forest sector will be increased through:

i. Increase in the budget of the MoEFCC, the BFD and the Bangladesh Forest Research Institute (BFRI) especially for forestry operations;
ii Increase in the budget of MoL & MOEFCC for updating land records of Forest Department;
iii. Funds from the Climate Change Trust; and
iv. Leveraging from or reallocation of funds of existing programmes to the 35 forested districts (i.e., One House One farm Project, social safety net programmes).

The government will also consider non-market-based approaches such as fiscal instruments, levies, fees suitable for REDD+. The Ministry of Finance, the Ministry of Planning, the National Board of Revenue and other institutions will play key roles in this regard.

International sources of funding will also be targeted such as the Green Climate Fund, the Least Developed Country Fund, the Special Climate Change Fund and Adaptation Fund, the Norwegian Climate and Forest Initiative and other multi- and bilateral sources. The National REDD+ Steering Committee along with the MoEFCC, the BFD (planning unit), the Economic Relations Division (ERD) and the Ministry of Planning in association with relevant institutions like PKSF and IDCOL will play a key role in this regard.

Ministries with implementation responsibilities will develop projects related to the REDD+ PAMs to access external funds. Moreover, ministers and departments will take programmatic approach as opposed to project approach, accessing revenue budget to ensure continuous funding for key activities (plantation programme, ICS programme, land record updating programme). Where applicable, ministries and departments will jointly develop projects for external and/or internal funding.

The National REDD+ Steering Committee, the REDD+ Cell, the REDD+ Stakeholder Forum and the TWGs along with the MoEFCC and implementing Ministries will ensure that while developing such detailed programmes/projects, sufficient consultations are held at the District and local level, such that stakeholders are properly engaged, understand clearly about the project being formulated, benefits and risks mitigation measures and roles and responsibilities.

Table 9: Summary of REDD+ PAMs

Policies and Measures	Cost in million US$	ER in M tCO_2eq	Strategy category	Enabling	Responsibility
Strategic Area 1 - Reduce deforestation and forest degradation					
Thematic area 1 - Promote supply of alternatives energy, energy efficient technologies and timber substitutes					
PAM 1 - Promotion of clean cooking stoves & other devices to households, small businesses and institutions	102	95.65	REDD		SREDA, IDCOL
PAM 2 - Emergency supply of clean cooking stoves & other devices to Forcibly displaced Myanmar citizens camp	163		REDD		Energy and Environment TWG of Cox's Bazar District
PAM 3 - Sustainable supply of alternative fuel and environment friendly technology including non-fired brick manufacturing for replacing traditional bricks kilns	272		REDD		DOE, SREDA, MOHPW
PAM 4 - Sustainable supply of alternative fuel for tobacco curing	1.5			X	Tobacco Industries, BFD
PAM 5 - Increase the use of processed timber, laminated wood, cane, bamboo and rattan products	1.5			X	BFIDC, Pvt Sector
Sub-total	**540**				
Thematic area 2 - Increase fuelwood supply in forested Districts					
PAM 6 - Establish structures (nurseries & tissue culture facilities) for increasing fuelwood seedlings stock	2	4.64		X	BFD, BFRI, Research Institutes
PAM 7 - Establish fuelwood plantation on marginal land under the social forestry programme	19		REDD		BFD, LGED, RTHD
PAM 8 - Promotion of integrated homestead forestry models	50		REDD		BFD
Sub-total	**71**				
Thematic area 3 - Improve livelihoods of forest dependent communities					
PAM 9 – Scale-up alternative income generating activity for forest dependent communities	321	4.82		X	BFD, MOA, MOFL, RDCD, MOCHTA & NGOs
PAM 10 – Collaborative and sustainable management of NTFPs	46		Enhancement		BFD, MOCHTA
Sub-total	**367**				
Thematic area 4 - Resolve forest land tenure issues					
PAM 11 – Modernization of forest land management system	20	***2.05***[14]		X	BFD & MOL
PAM 12 – Resolution of forest land related cases	9		RED		BFD & MOL
PAM 13 – Improvement of forest land management system	7			X	BFD & MOL
Sub-total	**36**				

[14] To avoid double counting (under PAM-17), this figure is only shown but not used in total ER calculation.

Policies and Measures	Cost in million US$	ER in M tCO_2eq	Strategy category	Enabling	Responsibility
Thematic area 5 - Improve institutional capacity					
PAM 14 - Increase capacity of the FD through recruitment and targeted trainings	5			X	BFD
Sub-total	**5**				
Strategic Area 2 - Enhance forest carbon stock					
Thematic area 6 - Reforest/Afforest, restore and conserve					
PAM 15 – Reforestation of deforested lands and afforestation of newly accreted coastal lands	1,179	135.79	Enhancement		BFD, BFRI, MOCHTA
PAM 16 - Enrichment plantation of degraded forest land	253		Enhancement		BFD, BFRI, MOCHTA
PAM 17 - Conservation of existing forests (149,548 ha avoided deforestation and 173,498 ha to avoid degradation; total 323,047 ha)	202		Enhancement		BFD, BFRI, MOCHTA
Sub-total	**1,634**				
Grand total	**2,654**	**241**			
Technical Assistant Support					
Development of the national Safeguards approach and the Safeguard Information System (SIS)	1.00			X	BFD
Integrated REDD+ sub-national implementation plan for the Hill Region	1.00			X	BFD, MOCHTA
Capacity building for REDD+ management (incl. NFMS, FRL, etc.)	7.00			X	BFD
Communication	2.50			X	MOEFCC
Research	2.50			X	MOEFCC

Part D

INSTITUTIONAL ARRANGEMENT FOR REDD+ COORDINATION; MONITORING AND REPORTING

INSTITUTIONAL ARRANGEMENT FOR REDD+ COORDINATION, MONITORING AND REPORTING

4.1. COORDINATION OF REDD+ IMPLEMENTATION

For successful coordination and implementation of national REDD+ strategy, the government has established the following institutional structures (Figure 6).

4.1.1. National REDD+ Steering Committee

Established in 2011, the National REDD+ Steering Committee is the apex body for REDD+ in Bangladesh. Currently, with a total of 42 members, it is represented by a comprehensive range of governmental and non-governmental stakeholders which includes 11 ministries, 15 agenciesy or departments, one member from CSO/NGO, one member from indigenous community, three representatives from public universities representing forestry faculty and two experts. It is chaired by the Secretary of the MoEFCC and the Deputy Chief Conservator of Forest/Convener of the REDD+ Cell of the BFD is designated as the Member Secretary.

Its primary function is to provide strategic leadership, guidance and facilitation support the BNRS implementation through playing overall management role, facilitating smooth coordination, data sharing and assigning key roles in financing REDD+ activities. Further, reports on the BNRS implementation, FRL, Summary of Information (SoI) on Safeguards and Biennial

Update Report (BUR) on GHG-I for the LULUCF sector will be periodically reviewed, updated and approved by the Steering Committee. The REDD+ Steering Committee is supported by the REDD+ Cell in the BFD and by two Technical Working Groups (TWG) on matters relating to National Strategy/Safeguards and forest monitoring and Measurement, Reporting & Verification (MRV). Meetings will be held once a year or more regularly if needed at which REDD+ implementation and other pertinent issues will be discussed.

4.1.2. REDD+ Cell

The REDD+ Cell, established in 2011, is located within the BFD. It is mandated to lead and coordinate REDD+ related activities in Bangladesh by spearheading the implementation, coordination and monitoring of all REDD+ activities. It includes 8 members represented by the Heads of the specialized units of Forest Department – Planning Wing, Administration & Finance, Wildlife and Nature Conservation Circle, Legal Unit, Management Plan Unit, RIMS Unit, Monitoring Unit and Development & Planning Unit.

The REDD+ Cell is convened/supervised by the Deputy Chief Conservator of Forests and the Assistant Chief Conservator of Forests is designated as the Member Secretary. Meetings of the REDD+ Cell will be held quarterly. It will assign technical responsibilities, as required, to two TWGs. The REDD+ Cell will provide secretarial support to all other committees.

4.1.3. Technical Working Groups

Two TWGs have been established to support REDD+ implementation, the Strategy and Safeguard TWG and the Measurement, Reporting and Verification (MRV) TWG.

The main role of the Strategy and Safeguard TWG is to provide decision support for proposals and options for technical choices related to the BNRS and safeguards-related issues. The TWG is composed of 14 members representing 4 Ministries, 4 agencies / departments, 3 universities, 1 NGO, 1 representative from indigenous group and 1 representative from media. The TWG will be directly accountable to the REDD+ Cell but will also provide reports and feedback to the REDD+ Steering Committee and the REDD+ Stakeholder Forum on request. In addition, the TWG will provide information to consultants and advisors essential for the adequate establishment of the structural elements for a functional REDD+ mechanism in the country.

The primary function of the MRV TWG is to provide technical support to the BFD in matters relating to monitoring, measurement, reporting and verification for land use change and GHG-I. The TWG is composed of 16 members representing of 7 technical departments, 3 universities, 2 government autonomous agencies. The TWG will contribute through regular meetings (every two months) and information exchange events (workshop, trainings etc.); compilation of information related to MRV for REDD+; contribution to reports, newsletter and other dissemination materials related to MRV for REDD+.

4.1.4. REDD+ Stakeholder Forum

The main role of the REDD+ Stakeholder Forum (RSF) is to act as the principal outreach and communication platform for issues relating to the forestry sector. It is a multi-stakeholder platform represented by 2

government agencies, 6 representatives from NGOs/CSO, 6 representatives from private sectors, 3 representatives from forest resource user groups, 3 members from indigenous community, 2 members representing youth and scouts and 1 member from media. This is the key body for ensuring that the opinions and priorities of all stakeholders are represented during implementation of the BNRS and will act as a supportive body to the REDD+ Steering Committee, the REDD+ Cell and the TWGs.

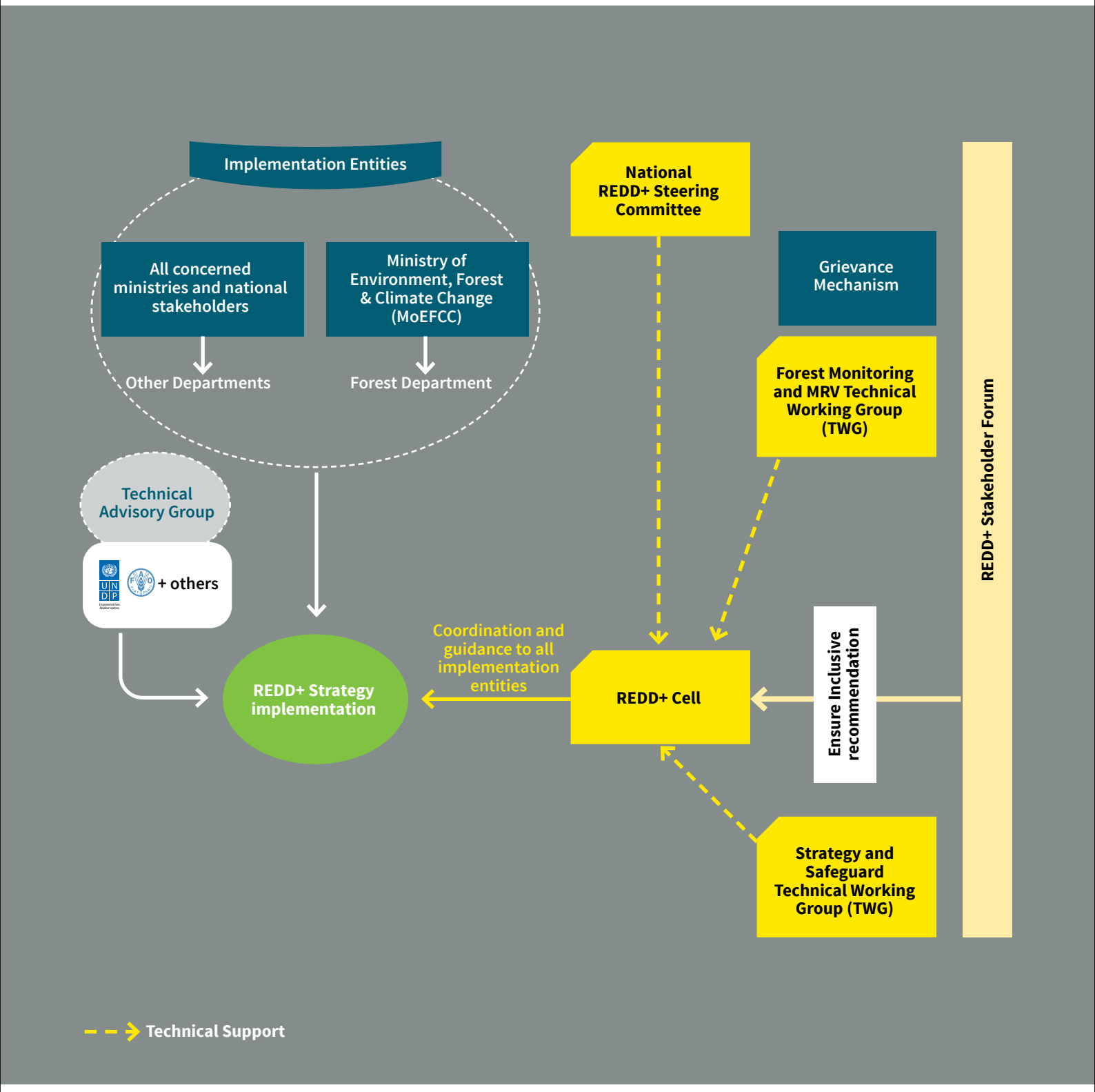


Figure 6: Institutional Structure for REDD+ Implementation

4.2. IMPLEMENTING ENTITIES

The MoEFCC, the BFD, the Ministry of CHT Affairs, the Sustainable and Renewable Energy Development Authority (SREDA), Power Division, the Infrastructure Development Company Limited (IDCOL), the Palli Karma Sahayak Foundation (PKSF), the Ministry of Land, the Chittagong Hill Tract Regional Council and the Chittagong Hill District Councils are the key implementing entities. All implementing and coordination entities have been identified in Table 10 and in the respective PAMs sheet in Annex 1.

Implementing entities are responsible to operationalize and implement their respective PAMs in coordination with the REDD+ Cell and to provide regular update as per the indicators identified and suggested by the TWGs. Implementing entities may exercise joint operationalization and implementation where applicable, especially in the Chattagram and Chittagong Hill Tract area.

Ministry of Environment, Forests and Climate Change (MoEFCC)

The MoEFCC will take overall lead in implementing the BNRS and will coordinate with the BFD on the progress and results of REDD+ implementation and on the review of reports and submission to the UNFCCC (see 4.4. Reporting to the UNFCCC). As its Chair, the MoEFCC will facilitate adherence to the decision taken by the REDD+ Steering Committee. The MoEFCC will support joint operationalization and implementation of the BNRS with key ministries i.e., Ministry of Chittagong Hill Tract Affairs, Ministry of Land, SREDA or IDCOL.

The MoEFCC will use the Local Consultative Groups and the Environment and Climate Change Subgroup to facilitate coordinated implementation.

Under the guidance of MoEFCC, the BFD will continue to operationalize the REDD+ Steering Committee, the REDD+ Cell, the TWGs and the REDD+ Stakeholder Forum, and formulate projects. The BRNS will be periodically reviewed, synchronizing with the updating of FRL.

Ministry of Chittagong Hill Tract Affairs (MOCHTA)

As stated above, priority will be given to the Hill zone during the BNRS implementation, of which the CHT is a significant area. In addition to the MoEFCC, the MOCHTA along with the Regional and three District Councils will play lead role for implementing the BNRS. In this context, a technical assistance project is recommended for the development of an 'Integrated REDD+ sub-national implementation plan for the Hill Region' (including CHT) and is described in Annex – 1.

Ministry of Land (MoL)

The MoL will actively support the MoEFCC for implementing PAMs under the Thematic Area 'resolve forest land tenure issues.' E.g. the Government will consider appointing officials for the position of Deputy Secretaries as Forest Settlement Officers on an emergency basis under the Deputy Commissioner in the major forest zones (especially in Hill, Sal and Coastal forest zones) dedicated only for settling the forest land reservation processes and therefore complete forest settlement processes, demarcate the forest and khas lands and update records accurately.

Sustainable & Renewable Energy Development Authority (SREDA)

SREDA supported by Power Division, under Ministry of Power, Energy and Mineral Resources, will mainly support implementation of PAMs under the Thematic Area 'promote alternative supply (fuelwood and timber) and devices.' SREDA will continue working to achieve target set under the Bangladesh Country Action Plan for Clean Cook Stoves 2013 i.e., by 2030 dissemination of cook stoves to over 30 million households in Bangladesh. Till date, SREDA has reached 6.5 million households. SREDA will scale up existing activities in the 35 forested Districts.

Infrastructure Development Company Limited (IDCOL)

IDCOL will mainly support implementation of PAMs under the Thematic Area 'promote alternative supply (fuelwood and timber) and devices.' IDCOL is the implementing partner for the Global Clean Cooking Program in Bangladesh[15], funded by Green Climate Fund and the International Development Association, World Bank.

[15] https://www.greenclimate.fund/projects/fp070

The total project investment is USD 82.2 million. Till date, 1.62 million Improved Cook Stoves (ICS) have been disseminated of which 710,979 has been distributed in the 35 forested Districts[16]. IDCOL has set a target of disseminating 5 million ICS by 2021.

Bangladesh Bank

Bangladesh Bank will mainly support implementation of PAMS under the Thematic Area 'promote alternative supply (fuelwood and timber) and devices.' It has recently adopted a relending scheme - "Financing Brick Kiln Efficiency Improvement Project" - with support from the Asian Development Bank for reducing GHG emissions from brick fields in the country. Out of total US$ 50 million allocation, the scheme has provision of US$ 30 million for conversion of traditional Fixed Chemistry Kiln to Improved Zigzag Kiln and US$ 20 million allocation for establishment of new Vertical Shaft Brick Kiln, Hybrid Hoffman Kiln and Tunnel Kiln. A total of USD 22.75 m has been disbursed to 11 sub-projects up to June 2018.

National Board of Revenue (NBR)

NBR will determine financial benefits (e.g. tax rebate or easy loan) to encourage promotion of non-fired bricks use in the private sector.

4.3. COORDINATION OF REDD+ TECHNICAL ELEMENTS

4.3.1. National Forest Monitoring System

The Bangladesh Forest Information System (BFIS)[17] plays a significant role for forest monitoring in Bangladesh. It contributes to data transparency, consistency and reduce data redundancy for quality outputs. It is a modern technology-based information management system to manage, collect, share, and update spatial and non-spatial data and information on forest and forestry related activities. All data, reports, maps, documents are available in one integrated platform. The system works as a web application and includes different modules/tools for assessing and monitoring the forest area changes, estimating GHG emission and removal by REDD+ activities and for finding, generating and collecting data to support decision-making and planning of forest management and conservation.

BFIS modules are organised according to four categories (1) development activities, (2) management and conservation, (3) forest assessment, and (4) knowledge management.

The 'Forest Assessment' category includes the 'BFIS Geoportal' module to support the Satellite Land Monitoring System (SLMS) and the 'Bangladesh Forest Inventory' module to support the national forest inventory and the 'Forest Emission Factor Database' module to support the GHG estimation for the forestry sector. Module 'BFIS e-Library' archived the meta data documents, reports, R scripts for data analysis, training materials, manuals etc. necessary for forest management and conservation.

The "land record" and the "plantation" modules are currently under development to provide site specific information for forest management and planning.

Additional updated spatial and non-spatial data, information, documents, reports etc. will be integrated in the BFIS and new modules will be added based on the needs, to support the collection, storing and monitoring.

The BFIS is managed by the BFD under the MoEFCC (figure 6). It provides direct and easy access to the BFD personnel to the central repository of database for

[16] http://www.idcol.org/old/bd-map_ics/bangladesh_map/
[17] http://geoportal.bforest.gov.bd/

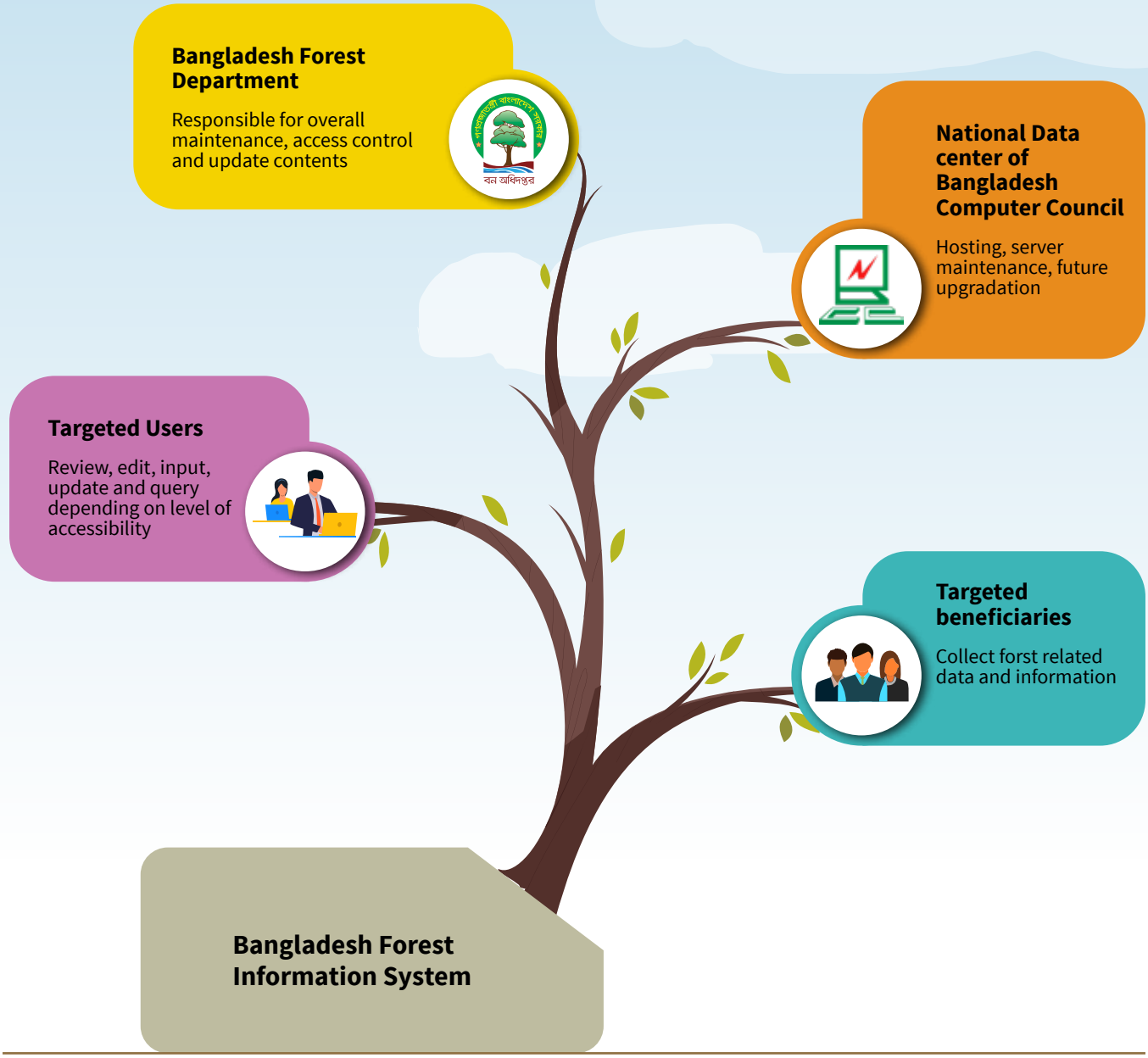


Figure 7: Key users and beneficiaries of Bangladesh Forest Information System

planning and decision making. Through Service Level Agreement, the system is hosted in the National Data Center of Bangladesh Computer Council (BCC) under the Ministry of Posts, Telecommunications and Information Technology. Coordination with BCC will be strengthened for the maintenance and hosting of new data and information modules in the BFIS.

To institutionalize data sharing among GoB and other institutions, the MOEFCC has endorsed "Data Sharing Guideline".

Building the Satellite Forest Monitoring System

The country developed the SLMS at the national level through harmonizing the land cover classes of existing maps. The capacities of 11 government and non-government organization (BFD, SPARRSO, SoB, BARI, BBS, BSGI, BUET, CEGIS, FAO, MoL and SRDI) were strengthened for the development of the SLMS through trainings, workshops, data collection and processing, reporting, technical support. The organizations worked together to develop a national land representation system (Figure 7) to produce consistent and comparable data for monitoring the forests and land cover change (GoB 2017).

During the readiness phase, the capacity of 11 government and non-government organization (BFD, SPARRSO, SoB, BARI, BBS, BSGI, BUET, CEGIS, FAO, MoL and SRDI) was built for the development of the SLMS through trainings,

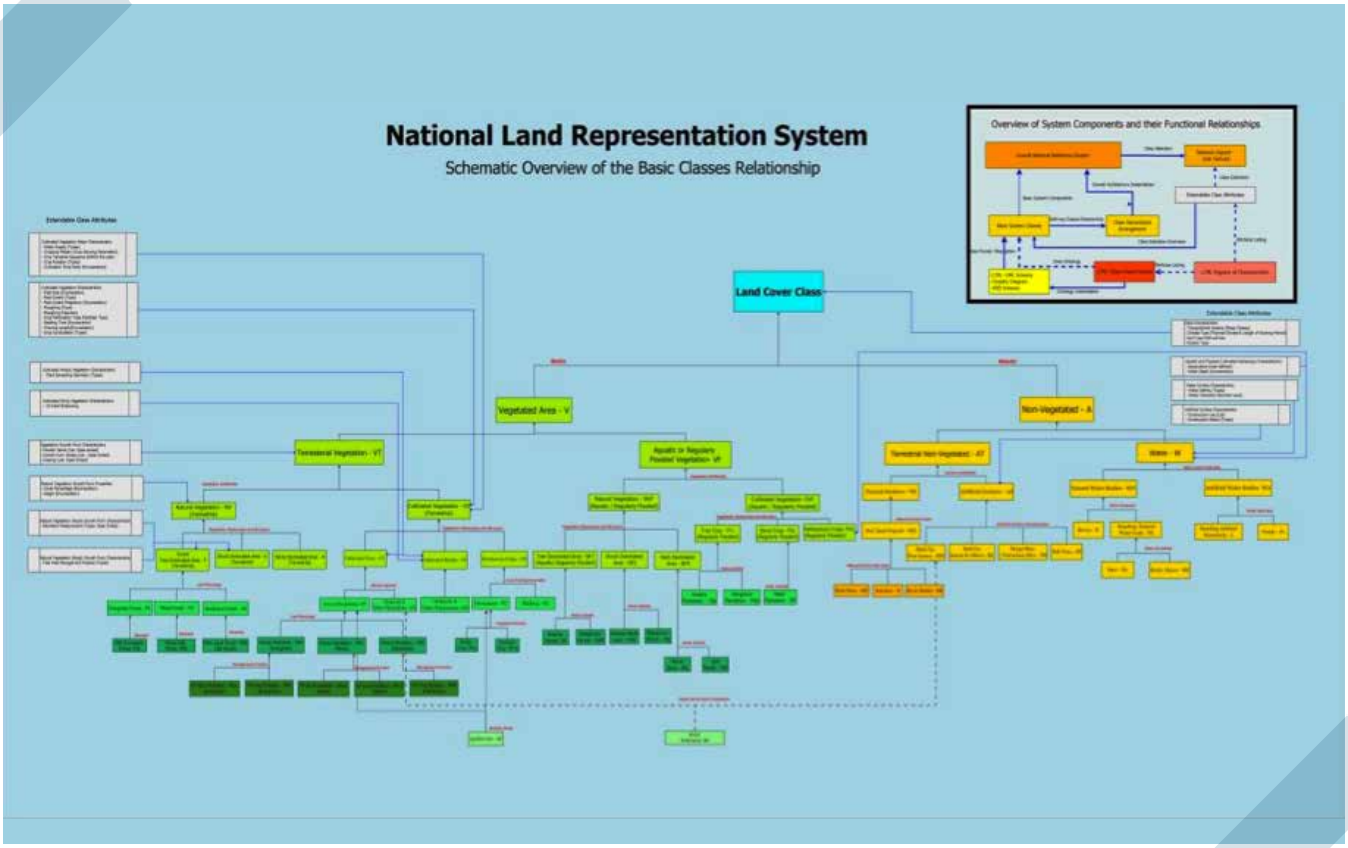


Figure 8: Land representation system of Bangladesh

workshops, data collection and processing, reporting, technical support. The organizations worked together to develop a land representation system (Figure 8) to produce consistent and comparable data for monitoring the forests and land covers change (GoB 2017).

By using the land representation system, the land cover maps for the year 2000 and 2015 (MOEFCC 2018) were produced. Likewise, a tree cover change map of 2000-2014 was developed (Potapov et al 2017) and integrated with the land cover information to provide additional information to monitor REDD+ activities as reflected in the FRL. The land cover maps are available through web based BFIS Geoportal.

In the future, the current methodologies used to produce land cover maps using high and mid resolution satellite imagery will be followed to produce temporal land and tree cover maps for assessing land cover/use change or activity data and its related impact on GHG balance. High resolution satellite imagery or free resource imageries will be used depending on the resource availability. Capacities and coordination among stakeholder organizations will be strengthened to update the data and information on the BFIS Geoportal.

Implementation of Bangladesh Forest Inventory

The Bangladesh Forest Inventory (BFI) was designed based on available data from more than 10,000 field inventory plots of past inventories (Costello, et al. 2016) and five BFI zones (Hill, Sundarbans, Coastal, Sal and Village zones) and the inventory was carried out in between 2016-2019 . It provides information on forest status, timber volume, biomass, carbon etc. The BFI consists of 1,856 plots for biophysical survey and 6,400 households for socioeconomic survey. Results are integrated with the land cover change information and are made available under the BFIS module 'Bangladesh Forest Inventory[18] for transparency, sharing and future monitoring.

Technical support was provided to the BFD for developing the BFI design and preparing digital forms to collect biophysical and socioeconomic data. The BFI biophysical design was finalized with support from three universities (SUST, CU and KU). Five pools (AGB, BGB, DWM, Litter and soil) were considered for data collection and will be used for updating the emission factors for estimating GHG-I from forestry sector.

BFRI and KU coordinated the development of species specific and common allometric equation for biomass calculation for the BFI zones and BNH supported the identification of tree species in the field during BFI implementation by providing trainings and developing the BGD tree app. BBS, DU, Arannyak Foundation and CU supported the design for preparation of the socioeconomic survey and the CNRS its implementation. SRDI and DU supported the development of the methodology for soil sample collection.

Coordination with all stakeholders will continue to conduct the periodical BFI which will produce consistent and comparable data for reporting the emissions and removals for REDD+ activities, GHG-I for National Communication as well as other national and international purposes.

Institutionalization of the BFI process has been initiated through a proposal to the MoEFCC for establishing a NFI unit in the BFD. The NFI unit will be responsible to conduct periodical NFI and maintain overall coordination. This unit will be strengthened with adequate officials, training and equipment for conducting the NFI and sub-national inventories.

4.3.2. Forest Reference Level

The BFD constituted an FRL working group inside the organization for supporting the FRL development and the GHG-I for the forestry sector. The MRV TWG provided suggestions and guidance throughout the FRL development process. TWG meetings will continue for discussion on the consistent and comparable activity data development and improvement of the FRL estimation.

Plot level data from the previous inventories was harmonized to develop emission factors for the calculation of emission and removal for the FRL (Costello, et al. 2016). A 'Forest Emission Factor Database'[19] was developed for supporting biomass calculation and was integrated in the BFIS (BFD, 2016). BFI data will be used to update the 'Forest Emission Factor Database' for future improvement of the FRL.

BFD will support the Department of Environment to report the GHG of LULUCF for the upcoming BUR and National Communication.

4.3.3. Safeguards and Safeguard Information System

Preliminary activities have been carried out during the readiness phase, such as a review of policy, law and regulations from safeguard perspective. Likewise, an initial study on Environmental Safeguard and Information System has been completed and social safeguards have been partially analysed under the studies on (i) land tenure and (ii) gender. Similarly, preliminary evaluation of environmental and social risks of the REDD+ PAMs have been evaluated.

Further actions are needed to develop the national safeguards approach and a fully functional SIS. This includes (i) assessing benefits & risks of REDD+ PAMs, (ii) identifying, assessing & strengthening safeguards-related policies, laws & regulations (PLRs) and institutional capacity to implement PLRs and (iii) identifying, assessing & strengthening systems and sources of information to develop Bangladesh SIS and preparing the first SoI. A plan to develop the SIS element has been developed and will be implemented in parallel to the BNRS implementation. (Annex – 1: TA Project – 2).

[18] http://bfis.bforest.gov.bd/bfi/
[19] http://bfis.bforest.gov.bd/nef/

Grievance Redress System

To avoid grievance during implementation of the BNRS, social and environmental safeguard procedures will be developed. The FPIC guidelines (UN-REDD 2013) will also be an integral part during BNRS implementation. Such prior engagement of stakeholders will ensure that concerns are addressed, and that environmental and social risks are minimized.

In instances, where concerns could not be addressed, then, depending on the concern/grievance, the complaint can either be raised through the REDD+ Stakeholder Forum or through the government's Grievance Redress System (GRS). Procedure for lodging grievance, contact person, relevant forms are available on all government websites including that of the BFD's, which include a link to the GRS system. Any citizen can submit his/her dissatisfaction or grievance against every department included within the GRS system. The GRS system is already operational and GRS focal points in the BFD and MoEFCC have been identified.

Grievances that allege corruption, coercion, or major and systematic violations of rights and/or policies, will be referred to organizational accountability mechanisms or administrative or judicial bodies for formal investigation, rather than to the REDD+ Stakeholder Forum and/or the GRS.

4.4. REPORTING TO UNFCCC

The national focal point to the UNFCCC is the Secretary, MoEFCC. Thus, the MoEFCC is responsible for liaising with other institutions in the development of and provision of reports related to REDD+. The MoEFCC will play a central role in bringing together information on REDD+ implementation, providing information to the bodies under the Convention and disseminating information from the international level to domestic actors.

Information on how specific requirements will be met is provided below and it is recognised that the MoEFCC will seek approval of all stakeholders involved in REDD+ implementation before submission of any report to the UNFCCC. Specifically, the BFD, supported by the REDD+ Cell for coordinating with relevant institutions, will collect data and produce technical reports. Reports will be reviewed by the TWGs and approved by the National REDD+ Steering Committee for subsequent submission by the MoEFCC.

BUR technical annex on Greenhouse Gas Inventory (GHG-I) for the LULUCF sector

Considerable capacity has been gained in the BFD and other institutions to support GHG-I for the forestry sector. The BFD in close collaboration with the DoE will prepare the BUR technical annex and the MRV TWG, followed by the National REDD+ Steering Committee will be responsible for the quality control before submission.

FRL

Bangladesh's first FRL was approved by the UNFCCC on July 2019. Country-specific emission factors for soil, deadwood and litter were identified through the BFI and will be used in the future improvements of the FRL. Technical support will be provided to the BFD to improve existing capacity allowing further improvement of the FRL. It is expected that Bangladesh will submit an improved FRL by 2024.

Summary of Information on REDD+ Safeguards

The MOEFCC is expected to submit the first Summary of Information (SoI) on REDD+ Safeguards to the UNFCCC as soon as ready. Subsequent SoIs will be provided every 4 years according to the timetable set by the UNFCCC.

Part E

CROSS-CUTTING ISSUES AND ENABLING CONDITIONS

CROSS-CUTTING ISSUES AND ENABLING CONDITIONS

5.1. GOVERNING PRINCIPLES

The implementation of the BNRS will follow international good governance principles, namely:

Rule of Law

As far as possible, the implementation of the BNRS will catalyze discussions among Ministries regarding conflicting Policies, Laws and Regulations. The success of the BNRS and its impact on the forest cover in Bangladesh will require fair legal frameworks that are enforced by an impartial regulatory body, for the full protection of stakeholders.

Transparency

Information related to the implementation of the BNRS should be provided in easily understandable forms and media; that it should be freely available and directly accessible to stakeholders; and that any decisions taken and their enforcement are in compliance with established rules and regulations. The BFIS will play a central role for this principle.

Responsiveness

The implementation of the BNRS will require that institutions identified for its management and for implementing the PAMs, and their processes, serve the best interests of stakeholders within a reasonable timeframe.

Consensus Oriented

The implementation of the BNRS will require consultations to understand the different interests of stakeholders in order to reach a broad consensus of what is in the best interest of the entire stakeholder group and how this can be achieved in a sustainable manner.

Equity and Inclusiveness

The implementation of the BNRS will require full and effective inclusion of relevant stakeholders at relevant levels and in all major stages and topics of decision making. Special emphasis shall be given to the inclusion of the interests of forest-dependent communities, including equitably men, women and youths. The BNRS provides the opportunity for stakeholders to maintain, enhance, or generally improve their well-being.

Effectiveness and Efficiency

The implementation of the BNRS will require that the needs of stakeholders are met, while making the best use of resources – human, technological, financial, natural and environmental.

Accountability

The implementation of the BNRS will require that management institutions and PAMs implementation institutions are accountable for its implementation. The management and steering of REDD+ implementation shall be oriented in achieving results as envisioned in the PAMs. Results should be, to the extent possible, measurable and quantifiable. Measuring and reporting capacities shall be developed where needed and appropriate.

Participation

The implementation of the BNRS will require participation by both men and women, either directly or through legitimate representatives. Participation needs to be informed and organized, including freedom of expression for the best interests of the organization and society in general.

Sustainability

The implementation of the BNRS shall contribute to sustainable land and resource use which satisfies the needs of present generations without compromising the fulfilment of the needs of future generations. PAMs shall be planned and implemented with the boundaries of resilience of ecosystems in mind including relevant safeguards for reducing risks and enhancing benefits from REDD+.

5.2. CAPACITY BUILDING

Capacity building for the BNRS coordinating and implementing institutions is critical to ensure a successful implementation. While technical capacity building activities are already embedded into the PAMs, continued skill development training programme on REDD+ issues are needed for both government and non-government stakeholders.

Under the leadership of the REDD+ Steering Committee and close coordination of the REDD+ CELL, continuous efforts are necessary to maintain and update the current capacity on REDD+ and ensure that all institutions

engaged in REDD+ implementation have the capacity to fulfill their mandates.

Key capacity building recommendations have been identified:

- Training on REDD+ for stakeholders (Member of Parliaments, Upazila Chairman, Government officials, NGO, CSO, representatives of indigenous communities, etc.);
- Carry out REDD+ project development trainings to officials;
- Continue technical training on REDD+ (GHG-I, GIS/RS, NFI, R-Software, etc.);
- Repetitive/periodic land use change assessment, drivers of deforestation and forest degradation assessment, updating of biophysical and socio-economic data, and information in the BFIS;
- Assessment of implementation progress of REDD+ strategy, lessons learned and revision / formulation of next programmes.

5.3. MAINSTREAMING GENDER IN REDD+ IMPLEMENTATION

During the BNRS implementation, gender balanced representation and participation will be strengthened building on the Social Forestry Rules (2004) which made it mandatory to maintain at least 50% women as beneficiaries. In Bangladesh, women play a significant role in the AFOLU sectors, harvesting resources for livelihood (such as fuelwood) or managing resources (such as homestead forests). They are also often negatively affected by indoor air pollution.

One of the key targets of the BNRS is to involve women in PAMs implementation. Acknowledging that there are socioeconomic, cultural and political barriers faced by women, deliberate action will be taken to ensure women are equitably, actively and meaningfully involved in REDD+ implementation.

Specifically, some PAMs are designed for women. PAM 1 on clean cooking (or other devices), PAM 7 on establishment of fuelwood plantations on marginal land, PAM 8 on integrated homestead forestry and PAM 9 on alternative income generating activity will prioritize women. Gender sensitive indicators have been identified for the monitoring and evaluation of these PAMs.

Ensuring women's engagement at the decision-making level is equally important. The TWG on Strategy and Safeguards already has representatives from the Ministry of Women and Children Affairs and from the Social Welfare Ministry. The RSF has set aside two positions for women – i.e., representatives from the Girls Guide and the Bangladesh Women Federation. It is acknowledged that better representation of women in the decision-making body will be promoted during REDD+ implementation.

5.4. COMMUNICATION STRATEGY

Strengthening the political advocacy, and increasing communication and interaction capabilities on REDD+ related issues are strategic to ensure that REDD+ is widely accessible, legible and understandable. Awareness raising among stakeholders from political leadership to grass root level is necessary to mobilize support towards forest conservation.

Communication activities are already embedded into the PAMs. For PAMs like rapid adoption of ICS (PAM 1&2), promotion of fuelwood plantations (PAM 5, 6 & 7), improvement of homestead forestry (PAM 8), sustainable livelihood (PAM 9) and collaborative management of NTFPs (PAM 10), awareness raising activities targeting women will be carried out to clearly depict their benefits. Specifically, energy fairs for women will be organized and the BFD together with SREDA will take advantage of the month-long tree fair at national and sub-national level to promote ICS and other devices. Awareness materials will be developed and used to raise awareness at the regional and local level on multiple benefits of forests and key drivers / negative impacts of deforestation and forest degradation.

At the higher policy level, the BNRS will be branded as a means to achieve multiple sectoral/institutional goals. The key message will be to promote the importance of the BNRS in meeting key national goals and objectives, i.e., in meeting the forest cover target, poverty alleviation, emission reduction, etc. Awareness materials in Bangla, such as posters, brochures, leaflets, articles and reports, short videos will be developed and workshops, meetings, international day observation, rally, community radio will be used as communication channels.

The RSF will have a key role in developing and communicating key messages to their respective organization. The RSF includes two representatives from the journalist associations and members from environmental activist organizations like the Bangladesh Poribesh Andolon and the Bangladesh Environmental Lawyers Association. Such platform plays a key role in creating mass awareness and mobilizing key constituencies in favor of REDD+.

Key communication activities have been identified as follows:

- Identification of key issues and previous lessons likely to be of relevance;
- Development of key REDD+ messages;
- Preparation of appropriate learning materials;
- Preparation of awareness-raising materials such as posters, pamphlets, radio programmes, video, etc.;
- Engaging media communities (TV, Radio, Community Radio, & Newspaper);
- Organization of awareness raising events;
- Development of policy paper;
- Organization of policy dialogue;
- Maintain and update website;
- Use social media in disseminating messages.

5.5. RESEARCH

Forestry research has a long history in Bangladesh but there is a need to update research topics and approaches to link closely with current information demand for successful REDD+ implementation.

For example, improved/alternative sources of fuelwood need to be identified and the efficiency of existing devices needs to be improved. New technologies should be economically accessible to reach markets in rural areas. The BNRS has identified research in areas of improved fuelwood, alternative fuel, clean cooking stoves, bio gas plants, efficiency of existing fuelwood species and briquettes as a priority. This will include:

- Research on (i) calorific value of available fuelwood species, (ii) identification of species for multipurpose uses (fuelwood, fuelwood and fodder, fuelwood and timber), (iii) identification of shade bearing fuelwood species for homestead (iv) consumers preferences;
- Research on benefits of clean cook stoves on reducing fuelwood demand, health, livelihood and women empowerment;
- Research on enhancement of energy efficiency of clean cooking stoves / bio gas plants;
- Research on economic production costs of various types of briquettes and other fuel devices manufacturing;
- Research on market penetration of LPG cookers and other new technologies.
- Research on efficient brick making technologies and green bricks

REFERENCES

Alam, M.K. 2008. Forests and forestry in Bangladesh. In: Ahmed, Z.U., Begum, Z.N.T., Hassan, M.A., Khondker, M., Kabir, S.M.H., Ahmad, M., Ahmed, A.T.A., Rahman, A.K.A. and Haque, E.U. (eds.), Encyclopedia of Flora and Fauna of Bangladesh, 1. Bangladesh Profile, Asiatic Society of Bangladesh, Dhaka, pp. 73-86.

Bangladesh Bank 2019. The Annual Report of the Bangladesh Bank for the Financial Year 2017-2018. Bangladesh Bank, the Central Bank of Bangladesh. Government of the People's Republic of Bangladesh. Available at: https://www.bb.org.bd/pub/annual/anreport/ar1718/full_2017_2018.pdf

Bangladesh Bank 2018. Quarterly Review Report on Green Banking Activities of Banks & Financial Institutions and Green Refinance Activities of Bangladesh Bank, April – June 2018. Bangladesh Bank, the Central Bank of Bangladesh. Government of the People's Republic of Bangladesh. Available at: https://www.bb.org.bd/pub/quaterly/greenbanking/greenbanking_aprjun2018.pdf

BBS 2018. National Accounts Statistics: Provisional Estimates of GDP, 2017-18 and Final Estimates of GDP, 2016-17. Bangladesh Bureau of Statistics (BBS), Statistics and Informatics Division Ministry of Planning. Available at: http://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/057b0f3b_a9e8_4fde_b3a6_6daec3853586/National%20Accounts_Book_2017-18.pdf

BBS 2017. Report on Bangladesh Sample Vital Statistic Survey 2016. Bangladesh Bureau of Statistics, Statistics and Informatics Division (SID), Ministry Of Planning, Government Of The People's Republic Of Bangladesh, Dhaka, Bangladesh.

BBS 2014. Report on Household Based Forestry Survey 2011-12. Bangladesh Bureau of Statistics (BBS) Statistics and Informatics Division (SID) Ministry of Planning. Available at: http://203.112.218.65:8008/WebTestApplication/userfiles/Image/Keyfinding/Key%20Forest2011-12.pdf

BBS, 2011. Statistical Year Book of Bangladesh, Bangladesh Bureau of Statistics. Ministry of Planning. Dhaka.

BBS 2010. Household Income and Expenditure Survey. Bangladesh Bureau of Statistics (BBS) Statistics and Informatics Division (SID), Ministry of Planning.

CREL-BFD. 2014a. Study Report on Selection and Analysis of Value Chains (Final) For South-East Region-Chittagong. Climate-Resilient Ecosystems and Livelihoods (CREL) Project of Bangladesh Forest Department (BFD), implemented by WINROCK International, funded by USAID.

CREL-BFD. 2014b. Study Report on Selection and Analysis of Value Chains (Final) For South-West Region. Climate-Resilient Ecosystems and Livelihoods (CREL) Project of Bangladesh Forest Department (BFD), implemented by WINROCK International, funded by USAID.

CREL-BFD. 2014c. Study Report on Selection and Analysis of Value Chains (Final) For North-East Region. Climate-Resilient Ecosystems and Livelihoods (CREL) Project of Bangladesh Forest Department (BFD), implemented by WINROCK International, funded by USAID.

Costello, L., Sola, G., Akhter, M., Aziz, T., Akhter, H. & Henry, M. 2016. Forest Biomass in Bangladesh: An Historical Review of Forest Inventories to Assist National Estimates. Bangladesh Forest Department, Food and Agriculture Organization of the United Nations, Dhaka.

FAO. 2018. The state of the world's Forest. Food and Agriculture Organization of the United Nations (FAO). Rome, 2018. Available at: http://www.fao.org/3/I9535EN/i9535en.pdf

FAO 2015. Global Forest Resources Assessment 2015: Desk Reference. Food And Agriculture Organization Of The United Nations Rome, 2015. Available at: http://www.fao.org/3/a-i4808e.pdf

FAO. 2010. Global Forest Resources Assessment. Main Report. Food and Agriculture Organization of the United Nations (FAO). Rome, 2010. Available at: www.fao.org/3/a-i1757e.pdf

FAO. 2008. National forest and tree resources assessment 2005-2007, Bangladesh. Rome. Available at: http://www.fao.org/forestry/17847/en/bgd

Franceschini, G., Jalal, R., Islam, M. S., Iqbal, Z., Aziz, T., Begum, A., Shewli, S. B., Shaunak, M. F., Jahan, M. N., Haque, S., Rahman, M. A., Hadi, A., Pramanik, T., Akhter, M., Costello, L., Udita, T. S. & Henry, M. 2016. Production Chain for Land Cover Mapping in Bangladesh. Dhaka, Bangladesh. Bangladesh Forest Department, Food and Agricultural Organization of the United Nations, Dhaka, Bangladesh.

GoB. 2017. National Land Representation System of Bangladesh. Dhaka, Forest Department, Ministry of Environment and Forests, Government of the People's Republic of Bangladesh.

GoB. 2015. Seventh Five Year Plan FY2016 – FY2020: Accelerating Growth, Empowering Citizens. General Economics Division, Planning Commission, Government of the People's Republic of Bangladesh.

IPCC. 2007. Fourth assessment report: chapter 9 Forestry. Available at: https://www.ipcc.ch/publications_and_data/ar4/wg3/en/ch9.html

IPCC. 2013. Climate Change 2013: The Physical Science Basis. Intergovernmental Panel on Climate Change (IPCC). Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp. Available at: https://www.ipcc.ch/report/ar5/wg1/

Islam, S.A. and Rahman, M.M. 2015. Coastal afforestation in Bangladesh to combat climate change induced hazards. Journal of Science, Technology & Environment Informatics 02(1): 13–25.

Jashimuddin, M. and Suratuzzaman, Md. 2017 Assessment of Tenure Issues Relevant to PAMs for a REDD+ Strategy in Bangladesh: Final Report. UN-REDD Bangladesh National Program, Bangladesh Forest Department, 30 November 2017. Dhaka

Mazumder, A. H., Choudhury, J.K., Chowdhury, K. 2018. Policies and Measures to Address Drivers of Deforestation and Degradation in Bangladesh. UN-REDD Bangladesh National Program, Bangladesh Forest Department. Technical Report, 27 April 2018, Dhaka.

MOEFCC. 2018. The submission of Bangladesh's Forest Reference Level for REDD+ under the UNFCCC. Ministry of Environment, Forest and Climate Change (MOEFCC), Government of the People's Republic of Bangladesh. Available at: https://unfccc.int/files/adaptation/groups.../loss_and.../ds_bangladesh_report.pdf

MOEFCC. 2017. Bangladesh Country Investment Plan for Forestry, Environment and Climate Change 2016–2021. Ministry of Environment, Forest and Climate Change (MOEFCC), Government of the People's Republic of Bangladesh. Available at: http://nda.erd.gov.bd/en/c/publication/bangladesh-country-investment-plan-for-environment-forestry-and-climate-change-2016-2021

MOEF. 2009. Bangladesh Climate Change Strategy and Action Plan 2009. Ministry of Environment and Forest (MOEF), Government of the People's Republic of Bangladesh.

MOEF. 2015. Intended Nationally Determined Contributions (INDC). Ministry of Environment and Forest, Government of the People's Republic of Bangladesh. Available at: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Bangladesh%20First/INDC_2015_of_Bangladesh.pdf

National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ICF International. 2016. Bangladesh Demographic and Health Survey 2014. Dhaka, Bangladesh, and Rockville, Maryland, USA:NIPORT, Mitra and Associates, and ICF International.

Poultouchidou, A., Islam, K., Akhter, M. 2016. The Emission Factor Database for the Land Use, Land- Use Change and Forestry (LULUCF) sector of Bangladesh, Dhaka, Bangladesh Forest Department, Food and Agricultural Organization of the United Nations.

Potapov, P., Siddiqui, B.N., Iqbal, Z., Aziz, T., Zzaman, B., Islam, A., Pickens, A., Talero, Y., Tyukavina, A., Turubanova, S., and Hansen, M. C. 2017 Comprehensive monitoring of Bangladesh tree cover inside and outside of forests, 2000–2014. Environ. Res. Lett. Vol 12, Number 10 (2017) 104015.

Khan, N.A. 2018. Forest Governance Study. UN-REDD Bangladesh National Program, Bangladesh Forest Department. 2018, Dhaka.

Quamruzzaman, M. 2014. An overview of Bangladesh furniture industry. The Daily Star, Dhaka. http://www.thedailystar.net/an-overview-of-bangladesh-furniture-industry-6612

Rahman, M.M., Rahman, M.M., and Islam, K.S. 2010. The causes of deterioration of Sundarbans mangrove forest ecosystem of Bangladesh: conservation and sustainable management issues. AACL Bioflux 3(2): 77-90.

Sarker, S.K., Deb, J.C., & Halim, M.A. 2011. A Diagnosis of Existing Logging Bans in Bangladesh. International Forestry Review. 13. 461-475. 10.1505/146554811798811344.

Siddiqi, N.A. 2001. Mangrove forestry in Bangladesh. Univ. of Chittagong, Nibedan Press.

Spalding, M., Kainuma, M., and Collins, L. 2010. World atlas of mangroves. Earthscan, London, UK.

Thompson, I., Jashimuddin, M., Rahman, M. M., and Khan, S. I. 2017. Drivers of Deforestation and Forest Degradation in Bangladesh. UN-REDD Bangladesh National Program, Bangladesh Forest Department, Technical Report. January 2017, Dhaka. Available at: http://www.bforest.gov.bd/site/page/5d40ef21-5f56-4933-af1d-5972252852f2/-

Uddin, M.S., van Steveninck, E.R., Stuip, M., and Shah, M.A.R. 2013. Economic evaluation of provisioning and cultural services of a protected mangrove ecosystem: a case study on Sundarbans Reserve Forest, Bangladesh. Ecosystem Services 5: 88-93.

UN-REDD Programme 2013. Guidelines on Free, Prior and Informed Consent. The UN-REDD Programme is the United Nations collaborative initiative on Reducing Emissions from Deforestation and forest Degradation (REDD+) in developing countries. Available at https://www.uncclearn.org/sites/default/files/inventory/un-redd05.pdf

ANNEX

ANNEX 1: **POLICIES AND MEASURES**

STRATEGIC AREA 1
Reduce deforestation and forest degradation

THEMATIC AREA 1
Promote supply of alternatives energy, energy efficient technologies and timber substitutes

PAM 1	**Promotion of clean cooking stoves & other devices to households, small businesses and institutions**
Objective	To reduce pressure of fuelwood collection on natural forests
Justification	Fuelwood demand for cooking at households, small businesses, tea stall, restaurants, educational and law enforcing institutions with dormitories, etc. is the main driver of deforestation and forest degradation.
Priority areas	Hill areas of Chittagong, Cox's Bazaar, Bandarban, Rangamati, Khagrachari Districts. Coastal areas of Noakhali, Patuakhali, Barguna, Bhola Districts Central Sal areas of Gazipur, Tangail, Mymensingh, Moulvi Bazar, Habiganj Districts
Targets	About 6,500,000 poor households and 10,000 hotels, restaurants, residential hostels/halls, orphanages, and barracks/mess
Estimated Cost	USD $102 million (unit cost of LPG = BDT 1,100 + 20% for operation, M&E and Communication)
Benefits	Reduced deforestation and forest degradation, increased carbon stock of natural forests, increased availability of NTFPs, improved health condition (smokes).
Recommended approach for implementation	Market-based approach that does not rely on subsidizing the cost of the stove, but rather in building the capacity of promising entrepreneurs especially women and expanding their production and distribution networks.
Activities	- Comprehensive programs and actions identified in Country Action Plan for Clean Cookstoves 2013 (SREDA), including: - Develop a series of financial instruments to increase affordability for consumers (by type i.e., individual, institutional (hostels, orphanage, barracks) and commercial (restaurants)) - Launch awareness campaign at different level especially targeting women at the grass root level (e.g. organisation of Energy Fair, trainings on using dry wood, using a weighted lid, controlling the air supply to the fire, etc.) - Build capacity of entrepreneurs especially women on how to improve quality of products, better understand consumer preferences and act on their feedback, attract investment, market their products; Strengthen after-sales services to consumers for various types of devices - Increased supply of clean cooking devices for households, small businesses and institutions with an emphasis on women households
Indicator for reporting	- Percentage of households, institutions and commerce using clean cooking stoves and other devices - Quantity of fuelwood saved annually per household/institution/commerce - Annual deforestation and forest degradation in targeted areas - Number of employment / incomes generated across the cookstove value chain
Coordination	The Household Energy Platform of SREDA and the REDD CELL of the Forest Department.
Implementation	Sustainable & Renewable Energy Development Authority (SREDA, clean cook program), IDCOL & partners, BCSIR, Bangladesh Energy Research Council, SME Foundation, PKSF, LPG supplier, Grameen Shakti, Briquet manufacturers, Bangladesh Bank's SME Division and NGOs and Private Sectors.
Timeline	**By 2030**

PAM 2	Emergency supply of LPG cookers for forcibly displaced Myanmar citizen camp
Objective	To meet emergency needs for clean cooking stoves/devices to reduce pressure of fuelwood collection on natural forest
Justification	Sudden surge of fuelwood demand for camp people has led to an increase of deforestation and forest degradation, threatening the natural forests of Cox's Bazar District
Priority areas	Forcibly displaced Myanmar citizens camp of Ukhia and Teknaf Upazila of Cox's Bazar District.
Targets	All forcibly displaced Myanmar citizens households (209,225; as per UNHCR[20] January data).Up to mid-2019, around 40% of camp households are using clean cooking stoves/ devices.
Estimated Cost	US$ 163 million up to year 4 (cost of 12 kg cylinder BDT 1100 + double burner BDT 3000 + Price of 12 kg LPG BDT 1050 + refill 12 nos per year for 4 year + 20% for operation, M&E and Communication).
Benefits	Reduction of fuelwood consumption by 0.41 million tons per year leading to reduced deforestation and forest degradation in Cox's Bazar District.
Recommended approach for implementation	Proper training on use and safety to be carried out to ensure adoption of the LPG cooker devices;
Activities	- Emergency supply of LPG with cooking stoves for camp households - Training of camp households on the use/maintenance of LPG devices
Indicator for reporting	- Percentage of camp households using clean cooking devices - Quantity of fuelwood saved annually per household in the camps - Annual deforestation and forest degradation in Cox's Bazar District
Coordination	Energy and Environment Technical Working Group of Cox's Bazar District
Implementation	Energy and Environment Department of UNHCR, IUCN and humanitarian NGOs working in Cox's Bazar District.
Timeline	**By 2019**

[20] https://data2.unhcr.org/en/situations/myanmar_refugees

PAM 3	**Sustainable supply of alternative fuel and environment friendly brick kiln technology including non-fired brick manufacturing for replacing traditional bricks kilns**
Objective	To reduce pressure of fuelwood collection on natural forest
Justification	Almost all brickfields in rural areas use fuelwood. These are mostly situated near forested areas. The country produces over 8.66 billion bricks a year and the sector has grown at 5.3 per cent over the last decade.
Priority areas	Hill areas of Chittagong, Cox's Bazaar, Bandarban, Rangamati, Khagrachari and Moulvibazar, Sylhet, Habiganj Districts
Targets	Total number of brickfields is 7,933 of which 4,520 are in forested Districts. Out of these, 1,252 needs to be replaced by 830 environment friendly technology (778 VSBK and 52 non-fired brick making technology).
Estimated Cost	Using VSBK (778 nos) & non-fired technology (52 nos) - US$ 226.71 million. Based on an assessment by ADB[21] initial capital investment for one VSBK at present value is estimated to be BDT 240 Lakh and for non-fired brick kiln unit cost is 70 Lakh (medium sized units to produce 40,000 bricks per day and cost of land) leading to a cost of 226.71 million + 20% of operation, M&E and Communication cost comes to US$ 272.05 million.
Benefits	Reduction of fuelwood consumption leading to reduced deforestation and forest degradation
Recommended approach for implementation	Using VSBK technology - US$ 429 million. Based on an assessment by ADB initial capital investment for one VSBK at present value is estimated to be BDT 240 Lakh and for 1252 units to be US$357 million + 20% of operation, M&E and Communication cost comes to US$ 429 million.
Activities	- Promotion of coal in rural brickfields - Recognition of brick kilns as a formal industry (SMEs) to ease access to financial resources; - Promotion of new technologies (e.g., BSVK, Hybrid Hoffman Kilns, Zigzag, Hoffmann-gas, Tunnel Kiln) - Promotion of alternative non-fired brick (green brick, hollo concrete blocks) - Enforcement of Brick Manufacturing and Kiln Establishment (Control) Act, 2013 - Financial rebate for companies using green bricks
Indicator for reporting	- Number of brickfields using coal as primary fuel - Number of brickfields using improved kiln technology
Coordination	Department of Environment
Implementation	Bangladesh Brick Manufacturers Owners Association, DOE, Power Division, Bangladesh Bank's SME Division, BUET, BCSIR, Housing and Building Research Institute, IDCOL, Industrial and Infrastructure Development Finance Company (IIDFC), Ministry of Industry
Timeline	**By 2030 all 830 brickfields in forested districts have improved practices (improved technologies, green bricks).**

[21] https://www.adb.org/sites/default/files/linked-documents/45273-001-ban-efa.pdf

PAM 4	Sustainable supply of alternative fuel for tobacco curing
Objective	To reduce pressure of fuelwood collection on natural forest
Justification	Wood is the main fuel for tobacco leaves curing. Tobacco plantation are spreading in the hill areas of Chattagram and in the Hill Districts and will impact on natural forests and homestead vegetation if alternative are not promoted. There are about 5,000 tobacco barns in the Chattagram Division. The total fuelwood consumed per year is around 35,000 tones. Efficiency of briquettes is 6 times more than traditional fuel[22]. It is therefore estimated that about 200 briquette production units will be necessary to supply required fuel.
Priority areas	In Hill areas of Chittagong, Cox's Bazaar, Bandarban, Rangamati, Khagrachari
Targets	200 briquette units to supply required fuel to 5,000 barns
Estimated Cost	US$ 1.5 million
Benefits	Reduction of fuelwood consumption by 7,000 tons per year for tobacco barn leading to reduced deforestation and forest degradation
Recommended approach for implementation	Market based approach for briquette production and capacity building of promising entrepreneurs especially women to expand their production and distribution networks.
Activities	- Promotion of alternativee to fuelwood such asdhaincha stick, sugarcane bagasse, tobacoo stalk, tobacoo by-product briquettee, maize stalk, etc. - Support entrepreneurship especially women development for production of briquette through financial incentives (easy loan, incentives) and training - Promotion of alternative cash crop to tobacco growers
Indicator for reporting	Number of tobacco barns using alternative fuelwood source
Coordination	The REDD CELL of the Forest Department in coordination with Tobacco manufacturers.
Implementation	Tobacco Industries (BATB, United Dhaka Tobacco, Nasir, Abul Khair, Aziz Uddin, Akiz Biri company), DAE, MOCHTA, FD
Timeline	**2025**

[22] http://www.fao.org/3/a-bp845e.pdf

PAM 5	Increase the use of processed timber, laminated wood, cane, bamboo and rattan products
Objective	Increase the use of processed timber and laminated wood to decrease the demand for solid wood.
Justification	The reduced market demand for solid timber will reduce illegal tree felling and will have a positive impact on conservation of timber trees and therefore reducing forest degradation.
Priority areas	Furniture and wood products sector in Bangladesh
Targets	Policy makers and wood and furniture sector
Estimated Cost	US$1.5 million
Benefits	Reduced used of solid wood and reduction of forest degradation
Recommended approach for implementation	Creating policy environment that promotes sectoral growth. Import duties on processed wood is quite high (92.30%) as opposed to the duty on solid wood (10.72%). Less import duties would support the sector, contributing to increased exports, more jobs and reducing pressure on solid wood demand.
Activities	- Identification of wood species to be used to produce laminated products - Promotion of laminated wood products, cane, bamboo and rattan furniture - Update/adopt Policy for small and medium enterprises for (i) better access to formal financing in the sector and (ii) for promoting the use of processed and laminated wood - Skill development training for furniture manufacturer
Indicator for reporting	- Number of processed wood manufacturer - Number of training provided to laborer engaged in the sector
Coordination	REDD CELL, BFIDC, Ministry of Commerce and Industries, Furniture Manufacturing Association
Implementation	BFIDC, MOEFCC, BFRI, Khulna University, Furniture Manufacturing Association, Ministry of Commerce and Industries, Ministry of Finance
Timeline	**2025**

THEMATIC AREA 2
Increase fuelwood supply in forested Districts

PAM 6	Establish structures (nurseries & tissue culture facilities) for increasing fuelwood seedlings stock
Objective	To ensure sustainable supply of high-quality seedlings of fuelwood species in forested Districts
Justification	To increase availability and quality (i.e., fast growing, high calorific value) of fuelwood seedlings and therefore reducing deforestation and forest degradation and dependency on seed sources.
Priority areas	Hill areas of Chittagong, Cox's Bazaar, Bandarban, Rangamati, Khagrachari and Moulvi Bazar, Sylhet, Habiganj Districts Coastal areas of Noakhali, Patuakhali, Barguna, Bhola Districts Central Sal areas of Gazipur, Tangail, Mymensingh Districts
Targets	Forest Nurseries & Training Centers (under the Forest Department) of 144 Upazilas - Mymensingh (13), Gazipur (5), Tangail (12), Noakhali (9), Patuakhali (8), Barguna (6), Bhola (7), Chittagong (22), Cox's Bazaar (8), Bandarban (7), Rangamati (10), Khagrachari (8); Moulvi Bazar (7), Sylhet (13), Habiganj (9). About 7 laboratories of universities and research institutions
Estimated Cost	US$2 million (BDT 700,000 per nursey and BDT 5,000,000 per laboratory)
Benefits	- Increased availability of fuelwood seedlings in forested Districts - Increased quality of planting materials and higher production of fuelwood species. - Reduced dependency on fuelwood from natural forests
Recommended approach for implementation	Careful selection of species and capacity building support to produce planting stock of high-quality standards, of a wide variety of local fuelwood and multipurpose species favored by the population.
Activities	- Assessment of the demand and quantity (capacities of Forest Nursery & Training Center to meet the demand) fuelwood in the forested Districts - Improvement of infrastructure and (i.e., internal passage, water facilities, boundary wall, nursery bed) and capacity (trainings) of existing Forest Nursery & Training Center - Free distribution fuelwood seedlings from FENTCs to individuals and institutions - Identification of mother /elite tree for tissue culture and establishment of nurseries - Field trials and production of quality planting materials - Development of protocol for mass propagation of identified fuelwood species
Indicator	- Number of Forest Nursery & Training Center with improved infrastructure and capacity - Number of species identified and propagated successfully - Number of newly grown fuelwood seedling per District - Number of fuelwood seedlings distributed
Coordination	Forest Department, Social Forestry Circle (FENTCs), REDD Cell, BFRI and all research organizations
Implementation	FD, Forest Nursery & Training Center, BFRI, Botanical Garden, University Botany Depts of Dhaka, CTG and Rajshahi, Bangabandhu Sheikh Mujibur Rahman Agricultural University, BCSIR
Timeline	2025

PAM 7	Establish fuelwood plantation on marginal land under the social forestry programme
Objective	To increase availability of fuelwood near forested areas
Justification	The development of alternative fuelwood sources outside natural forest (marginal lands) will reduce deforestation and forest degradation.
Priority areas	In Hill areas of Chittagong, Cox's Bazaar, Bandarban, Rangamati, Khagrachari and Moulvi Bazar, Sylhet, Habiganj Districts Coastal areas of Noakhali, Patuakhali, Barguna, Bhola Districts Central Sal areas of Gazipur, Tangail, Mymensingh Districts
Targets	Fuelwood species plantation on 10,000 km of stirp plantation
Estimated Cost	US$ 10 million for strip/embankment (BDT 134,803 per km + 20% for operation, M&E and communication)
Benefits	- Increased availability of fuelwood near natural forests - Reduced pressure on forests for fuelwood collection - Enhanced livelihoods of beneficiary households from sale proceeds.
Recommended approach for implementation	Through awareness raising and following social forestry approach that provides benefits to poor households. Fifty percent of the beneficiaries must be women.
Activities	- Identification of marginal lands (strip, road, embankment, railway line, etc.) available for fuelwood species plantation - Identification of beneficiaries (poor women headed households) and establishment of fuelwood plantations following the social forestry rules (with funds from the Tree Farming Fund) - Management / harvesting of fuelwood plantations, and benefits sharing from sales proceeds
Indicator for reporting	- Number of fuelwood trees planted on marginal lands - Quantity of fuelwood produced on marginal lands - Number of beneficiaries (gender segregated) - Total revenue and revenue per household
Coordination	REDD CELL, FD, CMOs
Implementation	FD, NGOs, and various projects, BAT, LGED, Roads and Highways, Water Development Board, Educational Institutions, Factory, Industries, BEZA, PKSF
Timeline	**2030**

PAM 8	Promotion of integrated homestead forestry models
Objective	To increase fuelwood supply at the household level
Justification	The development of integrated forestry models (incl. alternative fuelwood sources) at the homestead level will reduce deforestation and forest degradation.
Priority areas	In Hill areas of Chittagong, Cox's Bazaar, Bandarban, Rangamati, Khagrachari Districts Coastal areas of Noakhali, Patuakhali, Barguna, Bhola Districts Central Sal areas of Gazipur, Tangail, Mymensingh, Moulvi Bazar, Sylhet, Habiganj Districts
Targets	At least 700,000 extreme poor households (focus on women) are supported to increase fuelwood supply at the homestead level.
Estimated Cost	USD 50 million (BDT 6,000 per households)
Benefits	- Increased fuelwood supply near natural forests - Reduced pressure on forests for fuelwood collection - Improved livelihood of poor households
Recommended approach for implementation	Promotion of economically viable homestead forestry in and around small sized homesteads including fuelwood, timber and fruit trees, with an emphasis on species favored by the population. Fifty percent of the beneficiaries must be women.
Activities	- Identification of households living adjacent to natural forests - Design of integrated homestead forestry models, agro-forestry and other suitable models with various economic benefits (fruit, fuelwood, fodder, medicinal plants, etc.) - Promotion of selected models and training of households in collaboration with DAE and Forest Department - Implementation of selected models through incentive mechanisms (i.e. free supply of seedlings)
Indicators	- Number of households practicing improved homestead forestry - Number of fuelwood trees planted on homestead - Quantity of fuelwood produced on marginal lands - Revenue per household
Coordination	REDD Cell
Implementation	Projects of various government institutions, FD, DAE, PKSF, MOCHTA
Timeline	**2025**

THEMATIC AREA 3
Improve livelihoods of forest dependent communities

PAM 9	Scale-up alternative income generating activity for forest dependent communities
Objective	To improve livelihood of forest dependent communities and reduce pressure on natural forests.
Justification	Communities living around forested areas are generally poor. A recent study (CREL project of the Forest Department, 2014[23]) indicates an average yearly income per household in Sylhet, Khulna, Chattagram and CHT of BDT 76,941, BDT 44,730, BDT 81,000, BDT 65,852 respectively. These figures are even lower than the rural averages of these respective areas (HIES, 2010). Many government programmes and projects are targeting poverty reduction and improvement of livelihood of poor rural communities. Through enhanced coordination among government agencies, additional resources can be streamlined towards forested Districts and therefore enhance socio-economic impacts on forest dependent communities and achievement of sectoral targets.
Priority areas	In Hill areas of Chittagong, Cox's Bazaar, Bandarban, Rangamati, Khagrachari Districts; Coastal areas of Noakhali, Patuakhali, Barguna, Bhola Districts Central Sal areas of Gazipur, Tangail, Mymensingh, Moulvi Bazar, Sylhet, Habiganj Districts
Targets	At least 500,000 poor households (with emphasis on CHT) are supported by AIGA, and 500,000 hhs through improved accessibility to government programmes such as the 'Amar Bari Amar Khamar project', the 'One house one farm' project, 'Food for Work', 'Employment Generation Programme', 'Micro-credit for women', 'Micro-credit through PKSF', etc.
Estimated Cost	Financial support of about USD 322 million (BDT54,000 per household)
Benefits	- Improved livelihood conditions of poor communities - Reduced pressure on natural forest
Recommended approach for implementation	Selection of households dependent on forest resources for livelihood. Assess skills and/or traditional knowledge for proper utilization of financial support. Facilitate access to social safety net and livelihood programmes and where applicable, support women entrepreneurship development.
Activities	- Identification of priority households living adjacent to natural forests - Enhancement of inter-agency coordination at the central and local level. - Development of joint project / programmes among institutions. - Development of annual AIGA plan for selected Districts - Support to households in implementation of AIGAs - Develop value chain and market linkage of AIGA products
Indicator for reporting	- Number of forest dependent households (gender segregated) supported through various socio-economic programmes (e.g. Amar Bari Amar Khamar). - Incomes generated through AIGA per household - Amount of fund leveraged through other institutions
Coordination	REDD CELL
Implementation	Projects of various government institutions, FD, DAE, PKSF, MOCHTA, LGRD, Amar Bari Amar Khamar project (Ektee Bari Ektee Khamar)
Timeline	**2030**

[23] CREL-BFD. 2014a. Study Report on Selection and Analysis of Value Chains (Final) For South East Region-Chittagong. Climate-Resilient Ecosystems and Livelihoods (CREL) Project of Bangladesh Forest Department (BFD), implemented by WINROCK International, funded by USAID; CREL-BFD. 2014b. Study Report on Selection and Analysis of Value Chains (Final) For South West Region. Climate-Resilient Ecosystems and Livelihoods (CREL) Project of Bangladesh Forest Department (BFD), implemented by WINROCK International, funded by USAID; CREL-BFD. 2014c. Study Report on Selection and Analysis of Value Chains (Final) For North East Region. Climate-Resilient Ecosystems and Livelihoods (CREL) Project of Bangladesh Forest Department (BFD), implemented by WINROCK International, funded by USAID.

<table>
<tr><th>PAM 10</th><th>Collaborative and sustainable management of NTFPs</th></tr>
<tr><td>Objective</td><td>To increase sustainability of the supply and meet the demand of NTFPs in collaboration with communities.</td></tr>
<tr><td>Justification</td><td>Various NTFPs are harvested from forest areas resulting in forest degradation. The demand can be met by setting aside buffer areas for various products and through sustainable collaborative management of the resources. Better community engagement needs to be promoted to manage buffer areas. Such activity will also contribute to improve livelihoods of forest dependent communities. The 7th Five Year Plan explicitly mentioned engagement of communities in buffer areas for NTPFs production and management.</td></tr>
<tr><td>Priority areas</td><td>Hill areas of Chittagong, Cox’s Bazaar, Bandarban, Rangamati, Khagrachari and Moulvi Bazar, Sylhet, Habiganj Districts; Coastal areas of Noakhali, Patuakhali, Barguna, Bhola Districts; Central Sal areas of Gazipur, Tangail, Mymensingh Districts</td></tr>
<tr><td>Targets</td><td>Establishment of buffer NTFP plantation of 41,000 ha comprising of bamboo 5,000 ha, murta 3,000 ha; fuelwood 25,000 ha, medicinal plant 3,000 ha and cane 5,000 ha;</td></tr>
<tr><td>Estimated Cost</td><td>Total estimated cost USD 46.05 million.
<table>
<tr><th>Buffer Plantation Types</th><th>Unit cost in Lakh Tk</th><th>Target ha</th><th>Total cost in Lakh Tk</th><th>Cost in million USD</th><th>+ Operational, M&E & Communication cost (20% of total cost)</th></tr>
<tr><td>Bamboo</td><td>0.642</td><td>5,000</td><td>3209</td><td>3.82</td><td>4.58</td></tr>
<tr><td>Murta</td><td>0.750</td><td>3,000</td><td>2250</td><td>2.68</td><td>3.21</td></tr>
<tr><td>Fuelwood plantation</td><td>0.750</td><td>25,000</td><td>18750</td><td>22.32</td><td>26.79</td></tr>
<tr><td>Medicinal plants</td><td>1.084</td><td>3,000</td><td>3251.4</td><td>3.87</td><td>4.64</td></tr>
<tr><td>Cane</td><td>0.674</td><td>5,000</td><td>3371.5</td><td>4.01</td><td>4.82</td></tr>
<tr><td>Cost of training, planning meetings etc</td><td>LS</td><td></td><td></td><td></td><td>2.00</td></tr>
<tr><td></td><td></td><td>41,000</td><td></td><td></td><td>46.05</td></tr>
</table></td></tr>
<tr><td>Benefits</td><td>- Sustainable management of buffer areas (41,000 ha)
- Sustainable NTFPs generation and harvesting</td></tr>
<tr><td>Recommended approach for implementation</td><td>The shared management of NTFP resources is business oriented. Economic benefits are generated, and employments are created.</td></tr>
<tr><td>Activities</td><td>- Consultation with communities on objectives, targets, benefits and risks, management, coordination and support needs; Identification of buffer areas/marginal lands suitable for NTFP production
- Assessment of existing stock of NTFPs in the targeted areas and determination of sustainable harvest yields for each NTFP; Assessment of local demand; Consultation with Community Management Organizations (CMOs) to agree on NTFP management modalities and benefit sharing
- Training of communities / beneficiaries on NTPF nursery raising, plantation management, harvesting, and marketing; Development and establishment of NTPF sites in collaboration with CMOs</td></tr>
<tr><td>Indicators</td><td>- Area of buffer zone under NTFPs co-management per District
- Number of communities involved in co-management of NTFPs
- Quantity of NTFPs produced
- Sales revenue from NTFPs</td></tr>
<tr><td>Coordination</td><td>REDD CELL</td></tr>
<tr><td>Implementation</td><td>FD and CMCs, NGOs, various resource user groups</td></tr>
<tr><td>Timeline</td><td>2025</td></tr>
</table>

THEMATIC AREA 4
Resolve forest land tenure issues

PAM 11	Modernization of forest land management system
Objective	To clarify forest land ownership and secure tenure rights of forest villagers to reduce illegal encroachment
Justification	Absence of document and conspicuous demarcation of forest lands and lengthy procedure of disposing up land related cases in the courts encourage unauthorized and illegal encroachment into forest lands. In addition, earlier when forest labor was in serious shortage in remote forest areas, BFD established "Forest Villages" in reserved forest areas, whereby each family was given land for homesteads and agriculture. Over the years, population increased and so is the area of villages. Inheritance of land ownership needs to be resolved and villages area need to be demarcated to reduce risks of encroachments; The 7th Five Year Master Plan recognizes that absence of forest land record documents is one of the challenges of the forestry sector.
Priority areas	144 Upazilas in: Hill areas of Chittagong, Cox's Bazaar (8), Bandarban (7), Rangamati (10), Khagrachari (8),Moulvi Bazar (7), Sylhet (13), Habiganj (9) Districts; Coastal areas of Noakhali (9), Patuakhali (8), Barguna (6), Bhola (7) Districts; Central Sal areas of Gazipur (5), Tangail (12), Mymensingh (13)
Targets	- 1,000,000 ha of forest land surveyed and demarcated - Encroached settlements in all priority areas; - forest villages in Chittagong Hill Tracts, Chattagram, Cox's Bazaar, Sylhet
Estimated Cost	USD 20 million (costs includes map scanning, digitalization and rectification and cost of land survey.
Benefits	- Increased forest protection and reduced encroachment on public forest through land survey, boundaries demarcation and digital mapping - Secured rights of forest villagers
Recommended approach for implementation	Joint land survey (DRLS and BFD) in consultations with communities. Deputy Commissioners to resolve issues in an amicable way. At the minimum, tree cover should be maintained.
Activities	- Forest land survey and settlement in association with the Department of Land Record and Survey (DLRS), Boundary demarcation (incl. mapping); Digitization of boundary using GIS/RS technology - Prepare publicly accessible land tenure records & GIS/RS maps - Capacity Building of the FD - Survey and mapping of settlements within reserve forests - Identify people/families living inside forests; Involve forest villagers in collaborative forest management - Consultation with DC for availability of khas lands for resettlement and support voluntary resettlement
Indicators	- Area of forest land surveyed and mapped- Reduction in the number of land disputes - Reduction in forest land encroachment - Number of maps prepared - Number of people trained - Mapping of forest villages completed; Number of forest villager resettled in khas land - Area of forests regained from illegal occupancy
Coordination	National REDD+ Steering Committee, REDD CELL, Ministry of Land (DLRS), Forest Department, DC
Implementation	MOEFCC, Ministry of Land, DLRS, FD, DCs, Ministry of Finance, Ministry of Law
Timeline	**2030**

PAM 12	Resolution of forest land related cases
Objective	To reduce the number of conflicts related to forest land and improve forest land management
Justification	There are about 2,900 forest land related cases and 232 land related writ petitions (up to March 2019). Unless, coordinated actions are taken to resolve these cases, forest management activities cannot be implemented on these areas.
Priority areas	144 Upazilas in: Hill areas of Chittagong (22), Cox's Bazaar (8), Bandarban (7), Rangamati (10), Khagrachari (8),Moulvi Bazar (7), Sylhet (13), Habiganj (9) Districts Coastal areas of Noakhali (9), Patuakhali (8), Barguna (6), Bhola (7) Districts Central Sal areas of Gazipur (5), Tangail (12), Mymensingh (13) Districts
Targets	- 2,900 forest land (rights) related cases are resolved - 232 forest land (rights) related writ petitions are resolved
Estimated Cost	USD 9 million (BDT 240,000 per case)
Benefits	- Reduced number of conflicts on forest lands - Clarified forest land tenure allowing for forest management activities
Recommended approach for implementation	Advocacy at the higher level to solve forest land related cases. Formation of special committees, coordination with the Ministry of land and the Ministry of law.
Activities	- Advocacy at the higher level to speed up settlement of forest cases and/or form special legal committee on forest land (Ministry of Land, Ministry of Law, Ministry of Forest, Environment and Climate Change, retired Judge) - Assess forest land related cases and regroup by categories (i.e., encroachment; error in boundary or parcel of land; error in Modified Record of Rights (MRR) and Revisional Survey (RS); - Take legal action to solve the cases (and start resettlement with support from DCs and law enforcing agencies. - Carry out joint survey of boundary or contested parcel of land area involving DLRS - Take legal actions for cases originated due to error in MRR and RS - Capacity building on land law and case management and create a pool of experts
Indicators	- Number of cases resolved per year - Area of forest land reclaimed - Number of officials with increased capacity to handle land related cases
Coordination	National REDD+ Steering Committee
Implementation	MOEFCC, Ministry of Land, DLRS, FD, DCs, Ministry of Law
Timeline	**2025**

PAM 13	Improved forest land management system
Objective	To improve forest land management through accelerating reservation of forest lands and improving the coastal forests land development and transfer mechanism
Justification	To date, reservation of about 486,750 ha of forest is incomplete i.e., have not been declared under section 4 and 6 of the Forest Act 1927. Unless, coordinated actions are taken to accelerate the reservation process, forest management activities cannot be implemented on these areas. Existing mechanism for coastal forests land development and transfer of newly accreted lands favors deforestation and forest degradation. Improved coordination and joint assessment are necessary before transferring the land ownership from the FD to the Ministry of Land (MOL - Deputy Commissionaire). The Chittagong Hill Tracks Forest Transit Rules 1973 also needs to be reviewed and approved to reduce forest degradation.
Priority areas	Across all Districts of the Hill, Sal and Coastal zones
Targets	- 486,750 ha of reservation are completed - The costal forest land development and transfer mechanism is improved
Estimated Cost	USD 7 million
Benefits	- Improved forest land tenure security - Increased forest protection and reduced encroachment on forest lands
Recommended approach for implementation	Advocacy at the higher level to support forest reservation processes. Formation of special committees, coordination with the Ministry of land and the Ministry of law.
Activities	- Establish a coordination mechanism with Deputy Commissioners (DCs) and appoint Deputy Secretaries (DSs) as Forest Settlement Officer (FSO) under DCs for the land reservation process - Create a Land Cell in the Forest Department for regular monitoring - Carry out land reservation steps as per the regulations - Issue gazette notifications for newly reserved land - For coastal land, develop a land transfer suitability assessment mechanism and protocol in association with MOL, FD and DOE (piloting and sharing among key stakeholders for review and adoption) - Replace existing Government Order by the new coastal land transfer protocol - PLR review and revision of the Transit Rules for CHT
Indicators	- Area of forest land reserved per year - Area of land reclaimed per year - Updated coastal land transfer protocol - Revised Transit Rules for CHT
Coordination	National REDD+ Steering Committee, REDD Cell
Implementation	MOEFCC, Ministry of Land, DLRS, FD, DCs, Ministry of Law, DOE
Timeline	**2025**

THEMATIC AREA 5
Improve institutional capacity

PAM 14	Increase capacity of the BFD through recruitment and targeted trainings
Objective	To strengthened institutional, operational and technical capacity of the FD and improve forest management
Justification	Over 50% of the senior positions in the BFD are vacant. With large-scale retirements taking place in the next 2/3 years there won't be enough trained professionals to carry out the job.
Priority areas	Nation-wide
Targets	2,386 officials recruited immediately under the existing organogram; 7,676 officials recruited periodically under the proposed organogram (17,800) Skills development training program are organized for 5,275 officials; 50 officials for long term training (MS) and 225 for short term training
Estimated Cost	US$ 5 million (training costs)
Benefits	Increased capacity to manage forest resources and thereby reducing deforestation, forest degradation and enhancing forest carbon stock.
Recommended approach for implementation	Advocacy and sensitizing key policy makers. Development and implementation of skills development training programmes. Adequate budgetary allocation.
Activities	- Assessment of workload and foreseen needs to formulate a 10-year recruitment plan - Facilitate recruitment of staff and officers - Carry out a Capacity Needs Assessment and formulate a skills development training program - Implement the skills development training program; - Assessment of equipment and logistics (vehicle, boat, trawler, arms, GPS, computer, internet, etc.) needs at the field level.
Indicators	- Proposed organogram approved by the government - Percentage of position vacant by grade of officials - Number of officials trained by subject
Coordination	REDD Cell, Public Service Commission, Ministry of Establishment
Implementation	Forest Department
Timeline	**2025**

THEMATIC AREA 6
Reforest/afforest, restore and conserve

<table>
<tr><th>PAM 15</th><th>Reforestation of deforested lands and afforestation of newly accreted coastal lands</th></tr>
<tr><td>Objective</td><td>To increase forest cover of deforested and newly accreted lands</td></tr>
<tr><td>Justification</td><td>Bringing up the forest cover to 16% corresponds to the afforestation/reforestation of 637,259 ha of forest lands. Afforestation/reforestation often lack quality seedlings, decreasing impacts of such activities.
The priority given to the Hill and Coastal zones for afforestation/reforestation activities. The Hill zone alone represents 81.94% of reforestation potential in the country (needed to reach 16% of forest cover)</td></tr>
<tr><td>Priority areas</td><td>Hill areas of Chittagong, Cox's Bazaar, Bandarban, Rangamati, Khagrachari and Moulvi Bazar, Sylhet, Habiganj Districts
Coastal areas of Noakhali, Patuakhali, Barguna, Bhola Districts
Central Sal areas of Gazipur, Tangail, Mymensingh Districts
Village zone</td></tr>
<tr><td>Targets</td><td>Hill - 522,158 ha; Coastal - 111,715 ha; Sal - 2,080 ha; Village zone - 1,306 ha; Total - 637,259 ha</td></tr>
<tr><td>Estimated Cost</td><td>USD 1,179 million;
<table>
<tr><th>BFI Zones</th><th>Area in ha</th><th>Plantation cost per ha in BDT</th><th>Total Costs in million BDT</th><th>Total Costs in million USD</th><th>+ Operational, M&E & Communication cost (20% of total cost)</th></tr>
<tr><td>Hill</td><td>522,158</td><td>147,483</td><td>770,09.36</td><td>916.78</td><td>1100.13</td></tr>
<tr><td>Coastal</td><td>111,715</td><td>45,535</td><td>50,86.93</td><td>60.56</td><td>72.67</td></tr>
<tr><td>Sal</td><td>2,080</td><td>103,204</td><td>2,14.71</td><td>2.56</td><td>3.07</td></tr>
<tr><td>Sundarban</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Village</td><td>1,306</td><td>147,483</td><td>1,92.58</td><td>2.29</td><td></td></tr>
<tr><td></td><td>2.75</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>637,259</td><td></td><td>825,03.59</td><td>982.19</td><td>1178.62</td></tr>
</table></td></tr>
<tr><td>Benefits</td><td>Increased forest carbon stock</td></tr>
<tr><td>Recommended approach for implementation</td><td>Support community ownership and shared responsibility through community participation and engagement in every steps of afforestation / reforestation programmes and benefit sharing.</td></tr>
<tr><td>Activities</td><td>- Consultation with communities on project objectives, targets, benefits and risk, management, coordination and support needs.
- Land identification for reforestation and afforestation (for coastal area) in collaboration with communities.
- Literature review of past management plans for identification of area specific species at different stratum of forest;
- Literature review of silviculture characteristics of listed species (such as fruit/seed bearing within 7-10 years, fruits favored by wildlife, light weight seeds for wind dispersal, rapid growth characteristics, ability to grow in light or in shade etc.) and shortlisting of a group of desired trees
- Identification, selection and marking of mother trees of identified trees and seed collection, sorting and storage with support from communities;
- Development of nursery for identified species and germination of seedlings;
- Afforestation/reforestation in collaboration with communities.</td></tr>
<tr><td>Indicators</td><td>Area afforested/reforested by BFI zone</td></tr>
<tr><td>Coordination</td><td>REDD CELL</td></tr>
<tr><td>Implementation</td><td>FD and CMCs (for protected areas); For hill: Regional & District Council, MOCHTA, Universities, BFRI</td></tr>
<tr><td>Timeline</td><td>2030</td></tr>
</table>

<table>
<tr><th>PAM 16</th><th>Enrichment plantation of degraded forest land</th></tr>
<tr><td>Objective</td><td>To increase the forest carbon stock of degraded forests</td></tr>
<tr><td>Justification</td><td>A total of 173,671 ha of degraded forest area need to be restored through enrichment plantation (gap filling). Plantations often lack quality seedlings, decreasing impacts of such activities. The priority given to the Hill for restoration activities. The Hill zone alone represents 84.19% of the overall targets for enrichment plantation of degraded forests.</td></tr>
<tr><td>Priority areas</td><td>Hill areas of Chittagong, Cox's Bazaar, Bandarban, Rangamati, Khagrachari and Moulvi Bazar, Sylhet, Habiganj Districts
Coastal areas of Noakhali, Patuakhali, Barguna, Bhola Districts
Central Sal areas of Gazipur, Tangail, Mymensingh;
Village zone.</td></tr>
<tr><td>Targets</td><td>Hill - 146,210 ha; Coastal - 2,902 ha; Sal - 22,457 ha; Sundarban – 172 ha; Village - 1,929 ha; Total 173,671 ha;</td></tr>
<tr><td>Estimated Cost</td><td>USD 253 million
<table>
<tr><th>BFI Zones</th><th>Area in ha</th><th>Plantation cost per ha in BDT</th><th>Total costs in million BDT</th><th>Total Costs in million USD (BDT 84 = $1)</th><th>+ Operation, M&E & Communication cost (20% of total cost) in million USD</th></tr>
<tr><td>Hill</td><td>146,210</td><td>103,204</td><td>15089.45</td><td>179.64</td><td>215.56</td></tr>
<tr><td>Coastal</td><td>2,902</td><td>33,206</td><td>96.38</td><td>1.15</td><td>1.38</td></tr>
<tr><td>Sal</td><td>22,457</td><td>103,204</td><td>2317.64</td><td>27.59</td><td>33.11</td></tr>
<tr><td>Sundarban</td><td>172</td><td>45,535</td><td>7.85</td><td>0.09</td><td>0.11*</td></tr>
<tr><td>Village</td><td>1,929</td><td>103,204</td><td>199.07</td><td>2.37</td><td>2.84</td></tr>
<tr><td>Total</td><td>173,671</td><td></td><td></td><td></td><td>253.01</td></tr>
</table>
* - enrichment plantation cost is not necessary in Sudnarbans; mere protection will rejuvenate the area.</td></tr>
<tr><td>Benefits</td><td>Increased forest carbon stock</td></tr>
<tr><td>Recommended approach for implementation</td><td>Support community ownership and shared responsibility through community consultation, collaboration and engagement in restoration / enrichment programmes and benefit sharing.</td></tr>
<tr><td>Activities</td><td>- Consultation with communities on project objectives, targets, benefits and risk, management, coordination and support needs;
- GIS assessment of degradation (tree) cover classes (10-20%; 20-30%; 30-40%; 40-50%; 50-60%; 60%+) by zone by area (ha);
- Assessment of seedling requirement by cover classes;
- Land demarcation for enrichment plantation in collaboration with communities;
- Identification of local species for enrichment by cover classes;
- Development of nursery for identified species and germination of seedlings;
- Plantation at targeted sites in collaboration with communities.</td></tr>
<tr><td>Indicators</td><td>Area restored by zone</td></tr>
<tr><td>Coordination</td><td>REDD CELL</td></tr>
<tr><td>Implementation</td><td>FD and CMCs (for protected areas); For hill: Regional & District Council, MOCHTA, Universities, BFRI</td></tr>
<tr><td>Timeline</td><td>2030</td></tr>
</table>

<table>
<tr><th>PAM 17</th><th>Conservation of existing forests</th></tr>
<tr><td>Objective</td><td>To protect existing natural forest and plantations</td></tr>
<tr><td>Justification</td><td>Out of 1,269,070 ha of natural forests, 323,047 ha require conservation and protection measures through community engagement to avoid deforestation and forest degradation and increase the forest carbon stock through natural regeneration. The Hill zone represents 52.14% of the overall target for protection and conservation.</td></tr>
<tr><td>Priority areas</td><td>Hill areas of Chittagong, Cox’s Bazaar, Bandarban, Rangamati, Khagrachari and Moulvi Bazar, Sylhet, Habiganj Districts
Coastal areas of Noakhali, Patuakhali, Barguna, Bhola Districts
Central Sal areas of Gazipur, Tangail, Mymensingh Districts
Village zone</td></tr>
<tr><td>Targets</td><td>
<table>
<tr><th>Zone</th><th>Deforestation</th><th>Degradation</th><th>Total</th></tr>
<tr><td>Hill</td><td>134,447</td><td>146,210</td><td>280,657</td></tr>
<tr><td>Coastal</td><td>11,715</td><td>2,902</td><td>14,617</td></tr>
<tr><td>Sal</td><td>2,080</td><td>22,457</td><td>24,537</td></tr>
<tr><td>Villa</td><td>1,306</td><td>1,929</td><td>3,235</td></tr>
<tr><td>Sum</td><td>149,548</td><td>173,498</td><td>323,047</td></tr>
</table>
</td></tr>
<tr><td>Estimated Cost</td><td>USD 202 million; cost includes community patrolling by 6461 patrollers covering 323,047 ha for 15 years with BDT 500/day with 5% increment per year ($ 198 m) + cost of cyber tracker & GPS for patrollers $3.85 + cost of computers for 65 nos units (5000 ha = 1 unit) $ 0.04 million = $ 202 million.</td></tr>
<tr><td>Benefits</td><td>Increased forest carbon stock</td></tr>
<tr><td>Recommended approach for implementation</td><td>Support community ownership and shared responsibility through protection, management and benefit sharing with communities.</td></tr>
<tr><td>Activities</td><td>- Consultation with communities on project objectives, targets, benefits and risk, management, coordination and support needs;
- Formation of co-management bodies, community patrol groups, etc.;
- Training of the BFD and communities in SMART patrolling;
- Protection of targeted sites in joint collaboration with communities.</td></tr>
<tr><td>Indicators</td><td>- Area under co-management by zone</td></tr>
<tr><td>Coordination</td><td>REDD CELL</td></tr>
<tr><td>Implementation</td><td>FD and CMCs (for protected areas); For hill: Regional & District Council, MOCHTA, Universities, BFRI</td></tr>
<tr><td>Timeline</td><td>2030</td></tr>
</table>

TECHNICAL ASSISTANCE PROJECT-1

Project -1	Integrated REDD+ sub-national implementation plan for the Hill Region
Objective	To develop a sub-national REDD+ implementation plan to increase the transparency, local ownership, and social and environmental sustainability of REDD+ in the Hill Region.
Justification	Hill zone covers 60% of the National REDD+ Strategy targets. Formulation of a sub-national implementation plan involving local stakeholders (the three Hill districts are different in terms of stakeholders, political situation and socio-economy) is necessary for a successful implementation.
Priority areas	Hill areas of Bandarban, Rangamati, Khagrachari, Chittagong & Cox's Bazaar Districts
Targets	- Detailed plan for 1,330,070 ha of land, incl. reforestation (522,158 ha), enrichment plantation (146,210 ha), conservation and protection (661,703 ha); - Detailed tree resource development plan for 2,000 km of strip plantation for fuelwood supply; - Detailed plan and identification of beneficiaries of 'household ICS' (2,000,000); 'commercial ICS' (5,000); AIGA and other livelihood support (300,000); improved homestead forestry (300,000); - Detailed plan for 3,000 ha of bamboo, 1,800 ha of murta, 10,000 ha of fuelwood, 1,800 ha of medicinal plants and 3,000 ha of cane
Estimated Cost	USD 1 million
Benefits	REDD+ is mainstreamed into sub-regional planning
Activities	- Consultation with stakeholders on project objectives, targets, benefits and risks, management, coordination and support needs. - Formation of teams (local and national stakeholders) for different Districts of the Hill zone - Identify data needs / availability for detailed district level planning - Collect data by districts, carry out spatial and participatory planning sessions by districts, carry out field visits for field verification, carry out district level validation - Develop activity plans and implementation arrangements and modalities (role of stakeholders from regional, districts to Union level) for each intervention - Aggregate into regional level plan (sub-national REDD+ implementation plan) and organize validation for adjustment of targets across districts
Indicators	- Sub-national REDD+ implementation plan for the Hill Region approved by stakeholders
Coordination	REDD CELL and National REDD+ Steering Committee
Implementation	FD, MOCHTA, Regional & District Councils.
Timeline	**2020**

TECHNICAL ASSISTANCE PROJECT-2

TA Project -2	Development of the national Safeguards approach and the Safeguard Information System (SIS)
Objective	To clarify how the REDD+ safeguards are understood in the national context, and how they will be addressed and respected during implementation of the National REDD+ Strategy
Justification	REDD+ Readiness support received by Bangladesh did not include technical assistance on safeguards. An initial study on Environmental Safeguard and Information System has been completed and social safeguards have been partially analysed under the studies on (i) land tenure and (ii) gender. Similarly, preliminary evaluation of environmental and social risks of the REDD+ PAMs have been evaluated. Further actions are needed to (i) assess benefits & risks of REDD+ PAMs, (ii) identify, assess & strengthen safeguards-related policies, laws & regulations (PLRs) and institutional capacity to implement PLRs and (iii) identify, assess & strengthen systems and sources of information to develop Bangladesh Safeguards Information System (SIS) and prepare the first Summary of Information (SOI).
Priority areas	Nation-wide
Targets	REDD+ coordinating institutions
Estimated Cost	USD 1 million
Benefits	UNFCCC safeguards requirements are met
Activities	- Determine the goals and scope of Bangladesh's safeguards approach - Assess potential social, environmental and other benefits and risks of proposed REDD+ PAMs comprising the National REDD+ Strategy - Review PLRs, together with their implementation in practice, and clarify safeguards in Bangladesh context - Develop a SIS (scoping of institutional capacities, assessment of existing information systems & sources, SIS design and operationalisation) - Finalize a country safeguards approach document - Prepare the first SOI - Approval by the National REDD+ Steering Committee
Indicators	- National safeguards approach endorsed - Safeguard Information system developed and operational - Summary of information prepared
Coordination	REDD Cell
Implementation	Forest Department
Timeline	**2022**

ANNEX 2: **SUMMARY OF CONSULTATIONS FOR DEVELOPING THE BNRS**

DRIVERS OF DEFORESTATION AND FOREST DEGRADATION

The study on the drivers of deforestation and forest degradation in Bangladesh (Thompson et al 2017) was conducted through a literature review of thirty five papers on deforestation and/or forest degradation, and a series of nine District level workshops covering the four main forested areas of the country and three national workshops – one for validating the methodology, one to share primary data and one to present and validate final result. At the District level workshops, data were collected based on a questionnaire for participants (396 in total), open discussions (150), a series of interviews with key resource persons (28), and through focus group discussions (16) with local forest user groups (430) in each area. The questionnaire and open discussions allowed people to express individual and group opinions on the main drivers of forest change. A total of 169 participants attended the three national levelworkshops. In summary, a total of 1,145 people were consulted (953 male and 192 female) to identify and prioritize drivers of deforestation and forest degrdation in Bangladesh.

Subsequent to the drivers study, a study on land tenure and governance was carried out, where a total of 6 meetings/focus group discussions were carried with 389 participants (322 male and 67 female).

Study on the drivers of deforestation and forest degradation in Bangladesh: Consultation Process

REDD+ POLICIES AND MEASURES

REDD+ PAMs were developed through eight consultations at the District level, one validation workshop at the national level and two focus group discussions dedicated for women. Stakeholders consulted included officials of the BFD and relevant GoB technical agencies and administrative units at the local level, senior representatives of the established conservation NGOs, civil society and activists, representatives of indigenous communities, representatives from the academia, representatives from the grassroots level conservation stewards and development partners. In total 646 individuals were consulted (514 male and 132 female).

Indentification of REDD+ PAMs: Consultation Process

BANGLADESH NATIONAL REDD+ STRATEGY

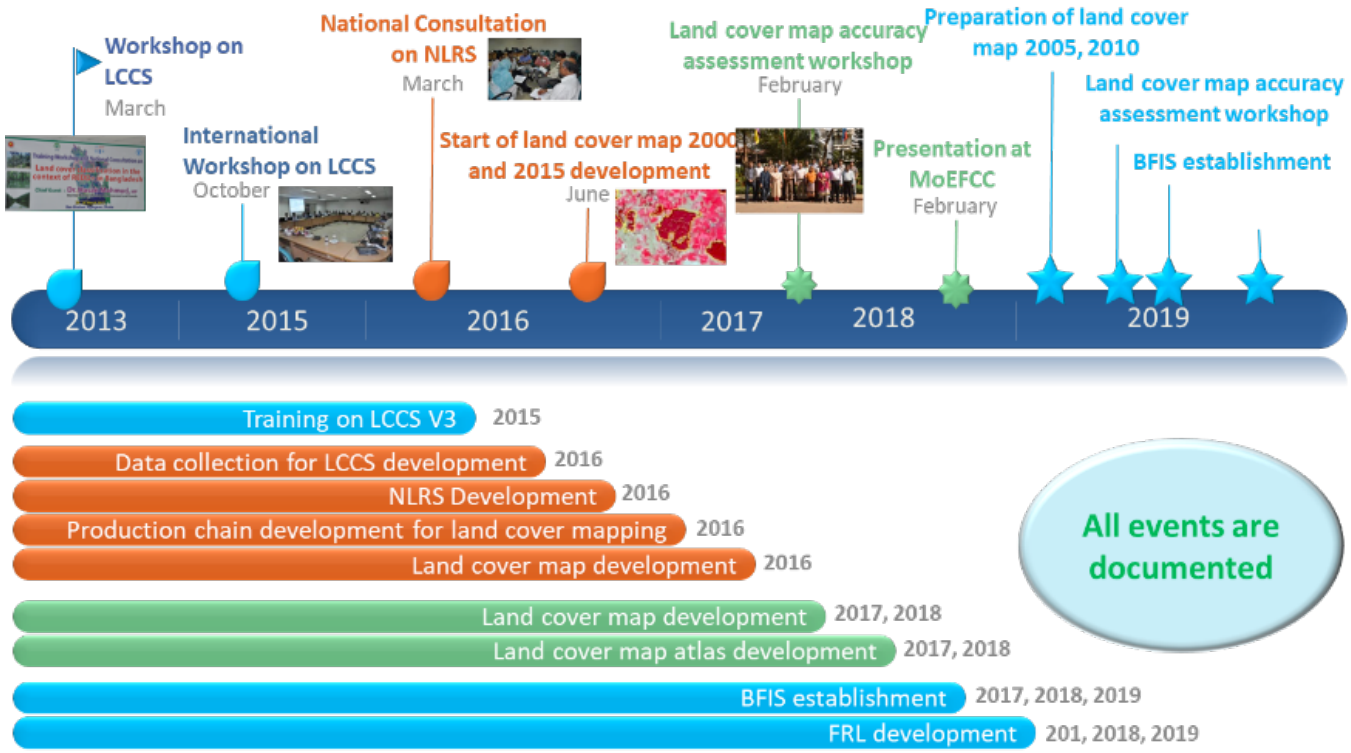
Following the identification and selection of the REDD+ PAMs, the identification of REDD+ management structure and PAMs implementation and coordination institutions, and after aligning targets to the FRL, a draft BNRS was developed building on the different technical studies implemented during the readiness phase. A draft was shared with stakeholders for inputs/ comments and national workshop was eventually held for its finalization and final endorsement.

Bangladesh National REDD+ Strategy: Consultation Process

NATIONAL FOREST MONITORING SYSTEM

Eleven national entities were involved in different steps of the NFMS development process (figure 1). Bi-monthly MRV Working Group meeting was conducted for guidance and knowledge sharing in the development process.

SLMS Development: Consultation Process



Organization involved in the process for data processing & analysis, technical trainings & workshops, reporting and technical support:
BFD, BARI, BBS, BSGI, BUET, CEGIS, FAO, MoL, SRDI, SPARRSO, SoB.

FOREST REFERENCE LEVEL

The Bangladesh Forest Department constituted a FRL working group for supporting the FRL development and GHG inventory for the forestry sector. Technical experts of the FRL working group and other national forestry sector stakeholders worked together for the development of FRL. MRV working group members provided suggestions and guidance throughout the FRL development process. The process of constructing the FRL was a valuable "learning-by-doing" opportunity for the technical experts of BFD and other stakeholder organizations.

ANNEX 3: **EMISSION REDUCTION POTENTIAL CALCULATION AND ASSUMPTIONS**

Policies and Measures	Targets	Calculations	Emission Reduction in million ton CO_2 eq	Assumptions
Strategic Area 1 - Reduce deforestation and forest degradation				
Thematic area 1 - Promote supply of alternatives energy, energy efficient technologies and timber substitutes				
PAM 1 - Promotion of clean cooking stoves & other devices to households, small businesses and institutions	6,500,000 hhs & 10,000 businesses	BAU = 0mtCO_2 Emission from LPG = 61.67 mtCO_2	61.67	Per household (of 5 members) savings of 1186 kg of CO_2 for LPG use per year. This figure has been used to calculate emission reduction for targeted HHs; BAU emission from LPG is = 0 as no information is available; LPG installation under strategy 433,333 per year. Targeted HHs to be brought under CCS by 15 years.
PAM 2 - Emergency supply of clean cooking & other devices to Forcibly displaced Myanmar citizens camp	209,000 hhs	BAU = 0 mtCO_2 Emission ER from LPG = 2.11 mtCO_2	2.11	As above; Targeted HHs to be brought under CCS by 4 years. UNHCR supplying LPG; per household savings of 1186 kg of CO_2 for LPG use per year[24]. Although target be achieved by 4 year.
PAM 3 - Environment friendly technology for replacing traditional bricks kilns	830 brickfields	BAU emission – 0 mtCO_2 Reduced emission = 30.89 mtCO_2	31.79	830 Brick Kiln will be required to supply bricks produced by existing 1,252 brick kilns. Out of 830, 778 is VSBK and 52 are non-fired brick kiln. As per data, 5000 brick fields emits 8.75 mt CO_2 therefore 1 brickfield emits 0.00175 mt CO_2. VSBK reduces roughly 70% less than traditional (FCK) ones[25].
PAM 4 – Sustainable supply of alternative fuel for tobacco curing	200 briquette making units	BAU emission – 0 mtCO_2 Reduced emission = 0.08 mtCO_2	0.08	One barn utilizes 7 tons of fuelwood per year[26]; 1kg wood = 1.8 kg CO_2; The conversion factor to calculate the briquette consumption equivalent is 6.11 kg of fuelwood = compared to the energy of 1 kg of briquette[27].
Sub-total			**15.36**	
Thematic area 2 - Increase fuelwood supply in forested Districts				
PAM 7 - Establish fuelwood plantation on marginal land under the social forestry programme	10,000 km (4,000 ha)	BAU sequestration – 0.127 mtCO_2 Increased sequestration = 0.507 mtCO_2	0.38	Assuming strip plantation in BAU and under REDD+ is 200 km per year and 400 km per year respectively; per hectare growth rate used 7 X 0.47 tC/ha/yr based on IPCC table 4.9 for Tropical rain forest continental Asia <20y;
PAM 8 - Promotion of integrated homestead forestry models	700,000 hhs	BAU sequestration – 0.44 mtCO_2 Increased sequestration = 4.69 mtCO_2	4.25	Per ha carbon is 431.68 ton; HH size is 0.05 ha; assumes targeted HHs have minimal / negligible carbon stock.
Sub-total			**4.64**	

[24] https://www.wlpga.org/wp-content/uploads/2015/09/substituting-lp-gas-for-wood-carbon-and-deforestation-impacts1.pdf
[25] http://centers.iub.edu.bd/chpd/Pres_Sem_Ijaz%20Hossain_Aprl%2017-08.pdf
[26] Based on information from British American Tobacco Bangladesh
[27] http://www.fao.org/3/a-bp845e.pdf

Policies and Measures	Targets	Calculations	Emission Reduction in million ton CO_2 eq	Assumptions
Thematic area 3 - Improve livelihoods of forest dependent communities				
PAM 10 - Collaborative and sustainable management of NTFPs	41,000 ha (bamboo 5000; fuelwood 25000; medicinal 3000; murta 3000 and cane 5000)	BAU sequestration – 0.67 $mtCO_2$ Increased sequestration = 5.50 $mtCO_2$	4.82	Targeted lands are deforested therefore carbon stock is nil; per ha carbon in Bamboo plantation is 122.72t; fuelwood – 121.81t; for medicinal, murta and cane plantation, per ha carbon of orchard and other plantation (shrub) – 60.53 t has been used. Values are from NFI inventory.
Sub-total			**4.82**	
Thematic area 4 - Resolve forest land tenure issues				
PAM 11 - To clarify forest land ownership and secure tenure rights of forest villagers to reduce illegal encroachment	14,038 ha	BAU emission – 4.44 mtCO2 Avoided emission = 6.48 mtCO2	2.05	14,038 ha deforested to various other land uses between 2000-2015; Assuming this amount of land will be stopped from encroached upon in next 15 years. Per ha carbon value of all forest zone are used for calculation, multiplied by 3.67 for conversion into equivalent CO_2.
Sub-total			**2.05***	*To avoid double counting (under PAM-17), this figure is only shown but not used in total ER calculation.
Strategic Area 2 – Enhance forest carbon stock				
Thematic area 6 – Reforest/Afforest, restore and conserve				
PAM 15 – Reforestation of deforested lands and afforestation of newly accreted coastal lands	637,259 ha (hill 522,158; coastal 111,715; sal 2080; village 1306)	BAU sequestration – 10.48 $mtCO_2$ Increased sequestration = 73.13 $mtCO_2$	62.65	All per ha Carbon value for each BFI zone obtained from NFI survey. Factor for equivalent CO_2 – 3.67; all figures transformed into million tons.
PAM 16 – Enrichment plantation of degraded forest land	173,498 ha (hill: 146,210; coastal 2902; Sal: 22,457; village 1,929)	BAU sequestration – 5.51 $mtCO_2$ Increased sequestration = 20.94 $mtCO_2$	15.42	Assuming 50% of per ha carbon for degraded sites already existing; therefore only remaining can be enriched; All per ha Carbon value for each BFI zone obtained from NFI survey.
PAM 17 – Conservation of existing forests (avoided deforestation, forest degradation and forest remaining as forest)	1,269,070 ha (Avoided deforestation and forest degradation 309,602; forests remaining forests 959,468)	BAU C Stock loss – 146.31$mtCO_2$ REDD+ emission = 88.60 $mtCO_2$	57.71	Only areas avoided deforestation and forest degradation under BAU scenario has been taken into calculation (i.e., 309,602 ha). Assuming 50% of per ha carbon for degraded sites already existing; therefore only remaining can be avoided;
Sub-total			**135.79**	
Grand total			**240.90**	

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
বন অধিদপ্তর

UN-REDD PROGRAMME

Food and Agriculture Organization of the United Nations

UNDP

UN environment