Proceedings of the inception workshop of the project on strengthening national forest inventory and satellite land monitoring system in Bangladesh

9 February 2016

The Forest Department of Bangladesh leads actions to improve forest management and conservation, adopting forward thinking, innovative approaches in its management of approximately 1.55 million hectares of land across the country.

In 2015, the Forest Department began a process to establish a National Forest Inventory and Satellite Land Monitoring System for improved forest and natural resource management. The process supports national objectives related to climate change mitigation and provides information in support of the UN-REDD programme aimed at Reducing Emissions from Deforestation and Forest Degradation (REDD+). The process also addresses domestic information needs and supports national policy processes related to forests and the multitude of interconnected human and environmental systems that forests support.

The activities implemented under the Bangladesh Forest Inventory process are collaboration between several national and international institutions and stakeholders. National partners from multiple government departments and agencies assist in providing a nationally coordinated approach to land management. International partners, including the United Stated Agency for International Development (USAID) and the Food and Agriculture Organization of the United Nations (FAO) are supporting the development of technical and financial resources that will assist in institutionalizing the process.

The results will allow the Forest Department to provide regular, updated information about the status of trees and forests for a multitude of purposes including for assessment of role of trees for firewood, medicines, timber, and climate change mitigation.

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Executive Summary

The Inception Workshop for "Strengthening National Forest Inventory and Satellite Land Monitoring System in Bangladesh" was held on the 9th of February at Pan Pacific Sonargaon, 107 Kazi Nazrul Islam Avenue, Dhaka 1215, Bangladesh.

The 110 participants (88 male and 22 female) were from several national institutions including the Forest Department, the Ministry of Environment and Forest, Soil research and Development Institute, Bangladesh National Herbarium, Bangladesh Space Research and Remote Sensing Organization, the Bangladesh Society of Geo-Informatics, BUET, Chittagong and Khulna Universities (Appendix 2).

The objectives of the inception workshop were the following: (1) Present the scope, methodology, objectives and expected results of the National Forest Monitoring project; (2) Discuss the project's multi-purpose agenda and collaborations that may assist the development of participatory monitoring process; (3) Provide an opportunity for key stakeholders to express their needs and expectations from the project.

Five key speakers representing MoEF, FD, USAID and FAO presented an overview of the project from the point of view of their organisations.

The introductory session was followed by group discussion animated around six questions and 3 topics. All participants were able to express themselves into small group and then each group representative presented the results of the discussion to the board audience.

Questions raised during the inception workshop focused particularly on methodological aspects such as integration of land cover and forest monitoring. This project is ambitious and just beginning. Its success will depend on the collaboration and involvement of many stakeholders.

Contents

1. Introduction

In Bangladesh, forest and tree resources play a crucial role for many sectors and millions of lives. Their conservation and better management is a national priority, for the government and all citizens. Trees and forests are not only useful and crucial for their timber, firewood and medicinal plant, but they also play a key role in regulating our climate and our daily life. While Bangladesh is recognised to be one of the most vulnerable to climate change, better forest and tree management is crucial for mitigation and adaptation to climate change.

However, the state and trends of the forestry resources are not fully known. Improving tree and forest assessment and monitoring is fundamental to guide actions to better manage natural resources and improve livelihoods. Under the guidance of the Forest Department under the Ministry of Environment and Forest, new technologies and new methods for improved monitoring are under development. The compilation of field data collection, remote sensing and satellite images builds on the past land cover and forest monitoring activities.

Collaboration between the Forest Department, related government agencies and International institutions is contributing to knowledge sharing required for an effective forest monitoring system to be established. On 9 February 2016, the inception workshop for the project S*trengthening national forest Inventory and Satellite Land Monitoring in Support of REDD+ in Bangladesh* saw the initiation of this process. The project is funded bythe United Stated Agency for International Development (USAID) and is supported with technical assistance from the Food and Agriculture Organization of the United Nations (FAO), SilvaCarbon. The project brings together a vast technical experience that is encouraging new and innovative approaches to forest monitoring and research in forest biomass dynamics.

A major objective is to assist the FD to set up the Bangladesh Forest Inventory and develop complete and sound updated information on the forest and tree resources. The Bangladesh Forest Inventory is a comprehensive process under the Forest Department that will assess, evaluate, interpret and report on the tree and forest resources status and the derivation of information, from repeated inventories that allow for the monitoring of change and trends over time. This technical process includes the data compilation and analyses of tree and forest resources from a multitude of data sources, including field inventories and remote sensing.

In collaboration with several national institutions and stakeholders, the Bangladesh Forest Inventory will provide updated information about the status of trees and forest, for a multitude of purposes including for assessment of role of trees for firewood, medicines, timber, climate change mitigation.

2. Background

The Forest Department of Bangladesh leads actions to improve forest management and conservation. About 1.5 Million hectares are being managed by the Forest Department. The Department has long experience with forest inventory and monitoring in different time under different projects to meet the project objectives. For the first time Forest Department conducted national forest and tree resources assessment during 2005-07 (NFA). As well as several sub-national inventories were conducted for different types of forests since 1959. Likewise Forest Department prepared land cove map for the country during the NFA. Several initiatives also have been taken for monitoring the forests under different projects since 1985 using remote sensing. All the data needs to harmonize to develop the reference level for the country as well as all resource information needs to be updated for the forestry sector.

This project will strengthen capacities for forest monitoring and assessment and Measuring, Reporting and Verification (MRV) activities in the forestry sector will be supported. The results of the national forest monitoring are needed to support the national policy processes and introduce integrated approach to forestry resources assessment that addresses domestic information needs as well as international reporting requirements. In this way, the FD will assist the GoB to in contributing to several national objectives including the assessment of national tree and forest assessment, the REDD+ reporting requirements, the production of data required for other international agreements, and support to national forest policy and land management.

To address these aims, the project will assist FD to build capacity related to the Measurement, Reporting and Verification (MRV) of REDD+ and establish a specialised Unit, update information on forest and tree resources and put in place a long term satellite monitoring system for forest ecosystems. The project will be implemented within a four year programmatic window that began on 1 January 2015. With the financial support of USAID and technical assistance provided by FAO and SilvaCarbon, the project will be housed and executed within the Bangladesh Forest Department.

Bangladesh has the potential to receive benefits from the UNFCCC for emission reductions under REDD+ mechanism. While the financial modalities have not been yet defined, result based actions will be measured, reported and verified. According to the decision 14/CP.19 of the UNFCCC, measuring, reporting and verifying anthropogenic forest-related emissions reductions is to be consistent with the methodological guidance provided in decision 4/CP.15, and any guidance on the MRV of nationally appropriate mitigation actions by developing country Parties as agreed by the COP. In addition, the data and information for MRV should be provided through a technical annex to the biennial update reports, underlining that the submission of the technical annex is voluntary and in the context of results-based payments. In addition, the decision specifies that results-based actions that may be eligible to appropriate market-based approaches that could be developed by the COP may be subject to any further specific modalities for verification.

3.   Rationale of the project

The Forest Department (FD) has identified a national forestry inventory and satellite forest monitoring system as the priority activities to address information gaps and support national policy processes. Yet, the demand of the stakeholders in Bangladesh for data and information on the state of the forestry resources is continuously expanding. In this regards, the project will develop complete and up-to-date information on forest and tree resources, assist the FD to set up a specialised structure "National Forest Inventory Unit" and put in place a long term satellite monitoring system of the forestry ecosystems. It will introduce a holistic and integrated approach to forestry resources assessment that addresses domestic needs based on relevant and up-to-date information. It will also address international reporting requirements related to climate change on timely and regular basis.

Justification of the project

1. Sustainable management of the forest resources needs up to date and reliable data on the social, economic and environmental benefits of forests and trees outside forests.
2. Basic countrywide information on the current state of forests and other ecosystems is inadequate, fragmentary and outdated. The existing data on the forestry resources at national level is based 2005-07 assessment.
3. Reliable estimates of the forest and ecosystem resources, consumption rate and real economic potential are still lacking. Generally, the awareness on their values is low. The extent of forest ecosystems and their rate of change over time are largely unknown.

4. In spite of the many achievements in institutional and policy reforms in the forestry sector, FD shows insufficient capacity to respond to the growing need of information in the country.
5. The NFI and SLMS are efficient tools to contribute to and guide the planning and implementation of the forestry and natural resources related programmes and projects.
6. In the context of reducing emissions from deforestation and forest degradation under the United Nations Framework Convention on Climate Change (UNFCCC), the NFI and SLMS are two of the three pillars to allow acquisition of robust and transparent estimates of forest carbon stock and stock changes.
7. Through UN-REDD and with coordination and support from the FD, FAO has the responsibility to support GoB to develop a transparent National Forest Monitoring System (NFMS). The UN-REDD programme suggests the NFMS to be based on three pillars namely the NFI, the SLMS and the greenhouse gas (GHG) inventory.
8. The project is linked to national Poverty Reduction Strategy and the 7th goal of the Millennium Development Goals.
9. It will set up a specialised structure in FD for data collection, updating of information, training of inventory personnel, developing norms and methods of inventories and assessments, helping define government policy in the area of knowledge generation, management and dissemination, etc.
10. It will create new baseline information complete in scope and harmonised with existing information with the international reporting requirements.
11. The project is, therefore, consistent with the objectives and priority areas of the Government policy and strategies that support social programmes.

4. Goal

The goal of the project is the strengthening of the National Forest Inventory and Satellite Land Monitoring System in support of REDD+ in Bangladesh. This contributes to both the REDD+ context, the production of data required for other international agreements, and support to national forest policy and land management. Project sustainability will be addressed through the strengthening of technical capacities and the establishment of an appropriate institutional framework.

5. Objectives

The project has the following immediate objectives:

1. Establish broad consensus at the national level on the process and approach to NFI and SLMS in Bangladesh, taking into account national users' information requirements for planning and sustainable management of the forestry resources and country's obligations of reporting to the international processes including GHG reporting and expected REDD+.
2. Strengthen the capability of FD to collect, analyse, update and manage the needed information on forests and Trees outside forests (TOF) for planning and sustainable management of the forestry resources and REDD+ MRV.
3. Develop a national database and information system on forests and TOF
4. Prepare national maps of forests and land uses based on harmonized classification and forest related definitions.
5. Undertake an NFI of the forest and TOF resources with the aim to create an information base according to national and international requirements and to set up a long term monitoring system of the resources.

6. Define long term satellite forest monitoring programme of the forestry resources, design multi-purpose forest inventory.
7. Develop tools and methods for integration of REDD+ MRV to NFI and SLMS methodology.

6. Main components of the project

The project focuses on the following outputs:

Output 1: General conditions to implement the national forest inventory reinforced

This output is crucial in order to ensure that the NFI and SLMS project will contribute to the national forest management plans and will contribute to the accomplishment of long terms strategic objectives. This output will be achieved through providing support to the establishment and strengthening of the NFI Unit, reinforcement of the National capacities in forest inventory and satellite monitoring, and the strengthening of forestry research programmes and harmonizing forest inventory information.

Output 2: National forest monitoring strategy reinforced

This will be achieved through setting up a clear participatory process to ensure adequate collaboration from different stakeholders, disseminating information to ensure the improvement of the current national system and to allow access to information to support the various policies related to forest and other natural resource management, rationalizing forest definition and a Land Cover Classification System, designing an appropriate multi-purpose NFI and SLMS forest inventory plan and successfully implementing the plan.

Output 3: NFI and SLMS planned and implemented

The main results from this output are the inventory plan to design and implement the NFI and SLMS. This will be achieved through the review of existing forest inventory designs, identifying multi-purpose NFI and SLMS objectives and reaching a consensus to approach and a method to develop and implement the multi-purpose NFI and SLMS. Output 3 will provide the necessary data to support forest policies, forest management planning and to take measures related to natural resource management, forest management and climate change reporting, and particularly will support the development of Emission Factors (EF) for the preparation of the GHG inventory.

Output 4: Value of forest ecosystem goods and services estimated.

Forest ecosystem goods and services have significant direct and indirect contributions to national economies and human welfare. The benefits people obtain from forests include forest goods, environmental services and sociocultural benefits. There has been no attempt to value these contributions of forest ecosystem goods and services in Bangladesh. As a result contribution of forestry sector is not well reflected in the national GDP. It is, therefore necessary to value forest ecosystem services and promote their inclusion in national economic accounts. This will also help to justify assessment of country's forest resources and sustainability of forest assessment and monitoring programme for future.

7. Conceptual Framework

The project has been designed in one phase that will include the design, the implementation of the National Forest Inventory and providing the necessary results in line with national objectives in terms of national forest management, including REDD+ programmes. Therefore, the project will be implemented during a period of four years in three steps as described below.

STEP I: Capacity Building and Preparation

This step includes all the preliminary arrangements and preparatory work for the project: i) training of the supervisors and field crews for NFI and SLMS; ii) Design and Methodology for NFI and SLMS, iii) GIS boundary finalization of the forest area by digitization of the sheet maps iv) acquisition of equipment and satellite images and; v) recruitment of national and international personnel. This is also the project's major capacity building phase.

STEP II: Data Collection through Field Survey

This phase will collect field data to be used in the NFI and SLMS. It will include materialization of the permanent sample sites in their field location, data collection from measurements of forest attributes, observations of forest and site attributes, field checking and validation of remote sensing analysis and interviews with local people and target groups as well as data entry and storage.

STEP III: Data Processing, Analysis and Reporting

The third phase includes development of the database storing cartographic and field data, training of the national staff in charge of the system, data entry, processing and analysis, reporting of project findings. Remote sensing validation data will be used to calibrate the national forest and land cover products. This information will be used to finalize and produce national atlas of forest cover and/or LULUCF in digital and hard copy formats.

8. Expected outcomes

The outcome of the project is the strengthening of the National Forest Inventory and Satellite Land Monitoring System in support of REDD+ in Bangladesh. This contributes to both the REDD + context, the production of data required for other international agreements, and support to national forest policy and land management. Bangladesh is one of the most vulnerable countries to climate change and forestry is identified as a crucial tool for mitigation and adaptation to climate change. Strengthening national capacities and the establishment of an appropriate institutional framework are priorities in this project because they determine the sustainability of activities to be implemented. In the context of international cooperation, the project is crucial to complement the UN-REDD programnme, support the national REDD+ Readiness Preparation Plan, and the project on capacity development of the Ministry of Environment and Forests. The project will aim at promoting modern methods and technologies while ensuring the necessary conditions for building innovations that are adapted, adopted and feasible. Project sustainability will be addressed through the strengthening of technical capacities and the establishment of an appropriate institutional framework.

9. Results from the group discussion

For what purposes do you need land cover/use maps?

There is a large consensus that land cover and use maps are crucial for land resource assessment, planning, management, and for decision making. In addition, such maps can be used to spatialize various important land cover related parameters such as the floristic composition, tree species distribution, wildlife, carbon stocks, and fishery. The integration of fine series data, combined with land cover/use maps, provide a huge potential of information about the status of the resources and changes of resources over time. In consequence, maps are important to manage forest and the forest related aspects for a multitude of needs including forestry and non-forestry needs. They provide information about the status of the resources, its quality and extent for the past, the present and the future, allowing the assessment of the changes, depending on their quality and

consistency. Land cover maps with additional predictive information about key parameters such as climate can be used for modeling and predicting changes of the resources in the future. The data about the past, present and expected future land cover/use are used for national and international purposes, to better manage natural resources at local and international levels.

What is the benefit of using a single map for multiple purposes and agencies?

There is a general consensus that a single map to represent the various land cover/use units within the country will significantly decrease confusion related to the status of natural resources, contribute to improve the robustness, consistency, accuracy and reliability of the information captured by spatial land monitoring institutions and ensure that the land cover products can be used by everyone. By providing a single product for various purposes, confusion about the status of natural resources will be decreased; decision makers will be better informed and oriented for improved natural resource management.

In addition, the development of a single land cover/use map will contribute to improve collaboration and coordination, improve cost- efficiency and to minimize conflicts between national institutions and conflicts related to land tenure. Land is very much fragmented and it is the development of a single map would be a good contribution to minimize discrepancies between the maps developed by different institutions. For doing this, a national classification system needs to be developed and institutions to agree on the sustainability of the land cover monitoring system. Such a classification system should be able to provide information about forest, agriculture, crop suitability, infrastructure, water bodies, fisheries and other purposes.

However, before being able to develop a single map for the different institutions and land management objectives, several aspects need to be well considered such as the issues related to definitions, national and sub-national boundaries, project systems, infrastructures and mandates for the development of the land cover maps. In order to ensure the sustainability and improvement of the system, the documentation and archiving of all the elements used for the development of the system are fundamental.

Which data should be shared and under which format?

All participants agreed that the term "data" includes biophysical and socio-economic information. While all participants agreed on the need to share data for better resource management and improved collaboration between the different sectors and institutions, the type of data to be shared differ between the groups and participants. While most of the participants agreed that maps, shape files, and any processed data are results and should be shared, sharing shape files is not agreed between the participants. Most participants agreed that sharing raw data should be done carefully and with restricted access. Some participants mentioned that raw data can be shared but without the geographic coordinates. All participants agreed on sharing documents and reports but there is no interface at current status. For digital information, most of the participants mentioned that sharing the digital data through a web portal would be useful. In addition, sharing high resolution images between institutions will significantly reduce the cost related to land cover/map development. It will contribute to increase the resources related to the accuracy and the validity of the geospatial products and provide better information for decision makers. Sharing data will improve the collaboration between the various institutions towards the implementation of a national system based on national standards.

Which are the current national framework to support data sharing between national public institutions?

There is a general consensus that there is no existing national framework for data sharing and a centralized information system would be very helpful. The RTI act targets rights to information and can be a good basis to develop a national framework for data sharing.

Several names of institutions were mentioned such as BBS, NSDI platform, survey of Bangladesh. While BBS has the mandate to archive and make available statistics information for Bangladesh, they do not have a repository or a web-platform for geo-informatics information. On the other hand, survey of Bangladesh is the national entity with the mandate to provide geographic information of Bangladesh.

How are the most important results to come from forest monitoring?

The participants mentioned the following important results

- Forest cover change and in particular monitoring of forest degradation and deforestation;
- Assessment of forestry services such as medicinal plants/ nutrition/ food security/ firewood;
- Soil degradation and soil fertility;
- Estimation of forest carbon stocks;
- The potential economic value of Ecosystem services;
- Socio-economic information and forest dependent people;
- Land use change;
- Growing stocks and productivity;
- Impacts of policies and measures on forestry resources;
- Preparation of scenarios for decision making;
- Biodiversity;
- Wildife;
- Measure, Report and Verify forest carbon stock and stock changes for national and international reporting;
- Tourism.

How might forest-related data be of benefit to other sectors (e.g., agriculture, health, nutrition, energy, water)

All participants recognized the role of forestry to contribute to various sectors. In Bangladesh, almost all citizens and sectors depend on the status of forest resources in the short and long term. People are dependent on the status of ecosystems and particularly on the status of tree and forest resources. Variables such as the following ones mentioned in the paragraph above contribute to guide policies and measures in a multitude of sectors:

In consequence, the national forest monitoring system does not aim at supporting only forestry activities but to contribute to natural resource management and the national economic system too. Furthermore, the consistency between the forest monitoring system with the land cover monitoring will contribute to improve the management of natural resources. In particular, participants pointed that forest related data will be beneficial to watershed management, soil degradation, human health and nutrition, adaptation to climate change, tourism, research.

In addition to the information mentioned above, the participants added some information not directly related to the six proposed questions.

The first point raised was related to the necessity to strengthen the capacities of the forest department for monitoring and assessing trees and forest. This concerns human capacities but also hardware, software etc.

The second point was related to the sustainability of such a system and the need to assess the resources every 5 or 10 years.

The third point was related to the need to use new technologies and that the launch of the first satellite of Bangladesh will contribute to the sustainability of the national system.

The fourth point was related to the fact that stakeholders need to be engaged as much as possible into this process to ensure a participatory process and national ownership. People should be taken on boat to develop this forest monitoring system. Co-management and social forestry are crucial to improve the social responsibility and awareness towards better management of trees and forest and towards the recognition of local actors into national decision making policies and measures.

The fifth point was related to the need for forest and land cover monitoring to have a clear picture of the current status and to take lessons from past and current programmes and projects.

The last point was related to the role of land cover monitoring in this project, about mandates of the different institutions and the use of different tools for monitoring for different purposes. It was explained that this project aims at ensuring that the forest related information are being integrated within the land cover map information and that national institutions collaborate together for the development of a national land cover map. The aim is to ensure that one product can provide the necessary information to different national stakeholders, for their different needs. Data sharing between national institutions and collaboration will allow the development of one national system and the development of the maps can be updated depending on available resources.
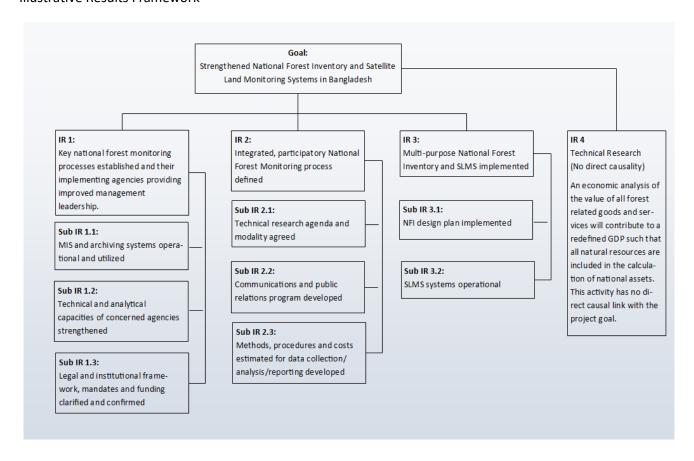
Appendix 1. Agenda

Time			Programmes
			Inaugural Session: Chaired by Md. Yunus Ali, Chief Conservator of Forests
09:30	-	10:00	Registration
10:00	-	10:05	Welcome note: **Mr. Mozaharul Islam**, Conservator of forest, National Programme Coordinator and UN-REDD focal point.
10:05	-	10:15	Project highlights: **Mr. Matieu Henry**, Chief Technical Advisor
10:15	-	10:20	Special guests: **Mr. Farhad Ghaussy,** Deputy Mission Director, USAID
10.20	-	10.25	Special guests: **Mr. Karl Wurster**, Deputy Director, USAID, Bangladesh
10:25	-	10:30	**Mr. Mike Robson**, FAO Representative in Bangladesh
10:30	-	10:35	Chief guest: **Dr. Kamal Uddin Ahmed**, Secretary, Ministry of Environment and Forest
10:35	-	10:40	Address by the Chair: **Mr. Md. Yunus Ali**, Chief Conservator of Forests
10:40	-	10:45	Group picture and End of the inaugural session
10:45	-	11:10	Coffee break
			Technical session, chaired by Mr. Kenichi Shono, FAO Regional Forestry Officer
11:10	-	11:20	Experiences in forest and land cover monitoring: experiences, needs and gaps
11:20	-	11:45	Round table and discussion
11:45	-	11:55	Data availability and data sharing process
11:55	-	12:20	Round table and discussion
12:20	-	12:30	Expected results from forest monitoring and beneficiaries
12:30	-	12:50	Round table and discussion
12:50		13:00	Closing Remark
13:00		14:00	Lunch
Each session will include time for discussion to promote stakeholders interaction, to enhance interest of participants in the project, and to encourage joint activities.			
Logistical arrangements will be arranged to accommodate national and international participants. Simultaneous translation will be considered as required.			

Appendix 2.   Result Framework

Illustrative Results Framework

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Goal:
Strengthened National Forest Inventory and Satellite Land Monitoring Systems in Bangladesh

IR 1:
Key national forest monitoring processes established and their implementing agencies providing improved management leadership.

Sub IR 1.1:
MIS and archiving systems operational and utilized

Sub IR 1.2:
Technical and analytical capacities of concerned agencies strengthened

Sub IR 1.3:
Legal and institutional framework, mandates and funding clarified and confirmed

IR 2:
Integrated, participatory National Forest Monitoring process defined

Sub IR 2.1:
Technical research agenda and modality agreed

Sub IR 2.2:
Communications and public relations program developed

Sub IR 2.3:
Methods, procedures and costs estimated for data collection/ analysis/reporting developed

IR 3:
Multi-purpose National Forest Inventory and SLMS implemented

Sub IR 3.1:
NFI design plan implemented

Sub IR 3.2:
SLMS systems operational

IR 4
Technical Research
(No direct causality)

An economic analysis of the value of all forest related goods and services will contribute to a redefined GDP such that all natural resources are included in the calculation of national assets. This activity has no direct causal link with the project goal.

Result Framework (Activities)
Output 1. General conditions to implement the national forest inventory reinforced
Activity 1. 1. Institutionalization of the NFI and SLMS strengthened
sub-activity 1.1.1: Support to legal preparedness
sub-activity 1.1.2. Enhancement of knowledge on international reporting (UNFCCC, CBD, FAO, etc.)
sub-activity 1.1.3. Organization of regular meetings on NFI and SLMS (Quarterly)
Activity 1. 2. Reinforcement of national capacities in forest inventory and satellite monitoring
sub-activity 1.2.1. Strengthening of forest inventory capability of stakeholders
sub-activity 1.2.2. Technical trainings (Local) on tools for forest monitoring (this includes GIS, RS, forest inventory, data analysis, forestry statistics)
Sub-activity 1.2.3: Capacity of young professionals for forest monitoring tools (GIS, RS, SLMS, etc.) reinforced
sub-activity 1.2.4. Capacity building on geospatial data processing and database management
Sub-activity 1.2.5 Participation in trainings abroad related to Forest Inventory and Satellite Forest Monitoring, REDD + programmes)
Activity 1. 3. Forestry research supported
sub-activity 1. 3.1. Development of allometric equations for important species based on ecological regions
sub-activity 1. 3.2. Support remote sensing researches in forestry
sub-activity 1. 3.3. Enhancement of national capacities in volume, biomass and carbon stock calculation
sub-activity 1. 3.4. Strengthening of modeling expertise
sub-activity 1. 3.6. Development and Upgrading of existing NFA Tree Species Data Base
Activity 1. 4. Existing remote sensing and field data collected, harmonized and reviewed
sub-activity 1. 4.1. National consultation on data sharing agreements implemented
sub-activity 1. 4.2. Development of land cover map index and satellite image database
sub-activity 1.4.3 - Research on very high spatial resolution satellite imageryfor forest monitoring
sub-activity 1. 4.4 Archiving and documentationof all existing inventory data and development of a robust database management system
sub-activity 1. 4.5 Regional workshop on the use of remote sensing for monitoring deforestation and forest degradation in tropical countries
Output 2. NFI and SLMS strategy reinforced
Activity 2. 1. Mandates and funding clarified
sub-activity 2. 1.1. International workshop on national forest inventory and monitoring systems (how the inventory planning, data collection, data management and analysis, QA/QC, etc. are performed in different countries)
sub-activity 2. 1.2. Identification of necessary resources for updating the NFI and SLMS
sub-activity 2. 1.3. Mandates to implement the national forest inventory and satellite forest monitoring clarified
Activity 2. 2. Participatory process developed and established
sub-activity 2. 2.1. Stakeholder Mapping involving different national institutions dealing in Forestry, civil society, forest communities and private sector

sub-activity 2. 2.2. Participatory process defined
sub-activity 2. 2.3. Development of participatory tools for forest monitoring
Activity 2. 3. Communication and public relation system implemented
sub-activity 2. 3.1. Support to Communication and public relation system
sub-activity 2. 3.2 Development of a web based platform for data sharing among national Stakeholders
sub-activity 2. 3.3 Support to address the gaps (if any) identified during establishment of FMIS through UN REDD programme.
Activity 2. 4. Common forest and land cover classification system/s agreed upon
sub-activity 2. 4.1. Rationalization of Land Cover Classification System
sub-activity 2. 4.2. International workshop on forest definition and land use representation system
Output 3. NFI and SLMS implemented
Activity 3. 1. NFI and SLMS design prepared and consensus on approach and method to NFI,SLMS and long-term monitoring reached
sub-activity 3.1.1 Objectives of the Multi-purpose National Forest Inventory identified
sub-activity 3. 1.2. National Seminar convened to inform all stakeholders about the scope, approach and timeframe of the project and exchange on ways of implementation to meet all users' needs.
sub-activity 3. 1.3. Review of existing inventory designs and provide recommendations for NFI design
Sub-Activity 3.1.4 : National consensus on national list of forest and tree attributes from NFI established
Sub-Activity 3.1.5 : Validation of NFI design (NFI design field verified and finalized)
Output 4: Value of forest ecosystem goods and services estimated
Activity 4.1: Diagnostic of forestry ecosystem services
4.1.1 – Collection of existing data and information related to forest ecosystem uses
4.1.2 – Analysis of needs and gaps expressed by different stakeholder groups and national development goals
4.1.3 – Diagnosis of the role of forestry ecosystem services and inter-dependency between services in national frameworks
4.1.4 – Undertake an analysis of the role of forest ecosystem on local and regional climate events
Activity 4.2: Evaluate economic, environmental and social Benefits
4.2.1 – Pre-analysis of the field socio-economic data
4.1.2 – Assessment of the opportunity cost of the main drivers and main forestry activities
4.1.3 – Comparative analysis of the opportunity costs for the main land uses and management activities
Activity 4.3: Awareness on forest ecosystem services enhanced
4.3.1 – Development of an analytical framework for forest ecosystem service analysis
4.3.2 – Set of complementary analytical tools identified and made available
4.3.3 – Knowledge transfer on forest ecosystem services
4.3.4 – Options analysis of the status of forest ecosystem services at national level

Appendix 3.   Results of the evaluation

Did the Inception Workshop provide suitable context of the project's approach and objectives?

Yes	50%
No	40%
Neutral	10%

Were you given adequate opportunities to provide input?

Yes	70%
No	20%
Neutral	10%

If not, what advice would you give to the project team?
The team should be clear that the message they r trying to make understand to the audience and that is really clear to the audience.
In the inception workshop huge task was provided and that was not described properly i.e. what would be the expectation from the participants were not clearly mentioned. The six theme should be discussed at least 2 days.
Engage right man in the right place during inventory.
Always we arrange some workshops in centrally for some new projects. I think that it is needed. But we have to arrange more workshops in different areas inviting the local all classes people. we can arrange it in upazila level inviting the adjacent people who are directly dependent on forest. For restoring forest, we have to send them the massages for population control because the poor people's each family has a big family with four or five or more kids. And then they are destroying the forest for a very few of money provided by the local politicians or rich-men.
The workshop is very much structured. This need to be semi structured. Some open questions will be helpful.
The group work was on very preliminary aspects, need more in-depth exercises; better would be if the participants are provided with some materials, well ahead of the workshop, regarding what the project is planning, i.e. course of actions.

From the perspective of your organisation or discipline, how are you going to benefit from the project implementation in the short, medium and/or long term?
It is obvious that we will get knowledge to conduct inventory.The FD and as a whole people of Bgd. Will be benefited.

1. Compliance of REDD+ implementation.
2. Future planning in the forestry sector.
3. Fulfilling the aspiration of all stakeholders.
4. Capacity building of Forest Department staff along with other
   stakeholders in respect of Forest Monitoring, using modern
   technology.

This is for the benefit of BFD. When we will know our resources we will manage it. It will also help in adaptation & mitigation of CC.
We can find out proper way of conservation if it accomplish properly.
I have heard that some training were arranged by this project for FD personnel on human resources but I

did not get any training on that though I am working in Establishment unit, FD. And in broader sense, I am telling about my organization's a big weakness and that is; FD has a very few first class officers for management of this Department. Presently, we have only two hundred ninety seven existing post, which of one hundred seventy two posts are filled-up and one hundred and seventy posts are vacant. Within this first class posts, cadre and non-cadre both posts are here but there is a big gap between cadre and non-cadre posts. In cadre officers they are getting all facilities by the government, but the non-cadre officers are not getting promotion or other facilities though the non-cadre officers have the good academic background. For this reason, one cadre officer are holding two or more charges but they do not work properly. On the other-hand, the non-cadre are depriving, they have to do more works under the cadre officers who are ten or more years junior to them (non-cadre). For resolving this situation, we have to go towards for en-cadrement. And in early, we have to create more i.e. about thousands first class posts in different categories for FD's good management. Earlier I have heard from some officers of Fisheries Department that they have total sixteen hundred first class officers all over Bangladesh. But they do not lease the wetland, locally Assistant Commissioner (land) lease the Khas ponds or wetlands. So I feel, We have to prime need to increase the first class post for the FD's existence. FD has a lot of land and forest, but it is a big challenge to protect land and forest in our populous country without the shortages of manpower. In FD, there is no first class officer in upazila level and one officer of a district level represent himself/ herself for all upazilas of that district but they have no logistic supports.

The information through NFI will be very helpful in all terms (short, medium and long)

Both short & long term.

Immediate issue: while we are promoting co-management in PAs, in the frame of MRV, it would be great if the project review our community-led monitoring approach, further strengthen/advice and appreciate in national level framework of MRV.

Medium-term issue: for PAs, we work, need a clearer boundary with mapping at detailed scales i.e. 1:15840 (4inch = 1 mile)

Longer-term issue: We are preparing CMCs, with small grants, for conservation financing; need a clearer picture, and practices on 'roles vs rights of CMCs in REDD+ to conserve remnant biodiversity in PAs'

The outcomes of the project may be useful as Land cover change modelling, Climate and Hydro-logical modelling, Base line data for EIA studies

What would be your recommendation to make this project a success?
After getting the work plan and technique then it be possible to recommend.
1. Preparation of suitable, practical and implementable Field Manual and user guide for filed crew. 2. Co-ordination among all stakeholders. 3. Robust analytical and reporting framework including capacity building.
More discussion with BFD officials as well as broadcasting in the print & electronic media. We should also discussed the matter with   Politicians, DCs, SPs, BGB, RAB, Army & other law enforcing agencies as their help is needed for field works
We should access forest resources properly by applying proper methods.
In earlier question's answer, I have discussed in detail.
More critical on design and tract numbers for plots to collect data.
Sincerity, Honesty & Timely implementation of the project.
In NFI, a well-accepted and relatively less costly design, so that GoB can finance in future; Develop a pool of local experts for RS/GIS mapping, field inventory, data processing & reporting to meet the demand of wider national and international fora.
Should not make hurry

What are the implications of the Bangladesh Forest Inventory on Biodiversity and Conservation?
Info. Should be generated as much as possible.
Biodiversity assessment and their contribution to livelihood of forest dependent people, highlighting their importance of conservation.
When we will be able to measure, our resources we will be able manage it.
In Bangladesh we always emphasis on wildlife conservation instead of their habitat development/conservation. We should survey food availability in the forest area for existing wildlife and counting how much forest area should be covered by plant genetic resources!
I think one and only solution for biodiversity conservation is population control. Due to over population, there is no land without population in Bangladesh. I heard that in Indonesia, there are some small islands, no people are living there. But in our country where land accretion have made some char very recently, some musclemen send some poor family to live there for owning the land. But it was very risky to survive there, but due to the poorness, people have to live there.
Yes. Will give a strong idea.
To know the Status of Biodiversity in BD. Helpful for both policy makers & managers to conserve it.
NFIs are mostly concern with trees, volume, stocks, diversity of species; a wider vegetation and faunal portion is always missing; can be a comprehensive biodiversity assessments. some relevant studies are being done, project based and/or academic purposes - can be harmonized
BFI may be used to estimate forest biodiversity features and related indicators which are required for sustainable forest management.

What are the implications of the Bangladesh Forest Inventory on Timber Productivity?
Level of extraction should come from this inventory.
1. Assessment of productive area. 2. Assessment of Annual allowable cut. 3. Investment Plan.
If we can complete it successfully, we will broadcast it and people will be aware of it and ultimately timber productivity will increase.
Annual timber production from govt forest and homestead forest should be acessed. Annual timber demand need to be accessed also.
Due to scarcity of land and over populous country, how could we think about the timber productivity! Due to the ignorance, the poor people has a number of kids and then they used to go to the forest for illegal tree falling. Only a very few number of forest officials could not protect the forest when a big number of forest villagers attacked the forest. So at first, the poor people should be award for small family and they should have another job except illegal tree falling.
Yes. Will give a strong idea.
To know about growing stock of the forest & trees in other designated land.
An important aspect, all inventory focuses to; Since for last 20 yrs, moratorium is being maintained, it is not of many interests now; however, this inventory would pave a policy change for sustainable harvest. Hence CAI, MAIs for each forest divisions should have a picture from this NFI, to frame future management plans.
The BFI data will help to identify the Timberland and the BFI data may be used for modelling of Timber volume or growth, which will enhance the ecosystem services of forest.

What are the implications of the Bangladesh Forest Inventory on Livelihoods?
Demographic data should be collected properly for good prescription.
How forest ecosystem supports livelihood including non-carbon benefits.

Livelihood will also increased. We will measure the tree inside forest as well as tree outside forest. We will also measure how much contribution of forestry sector for livelihood of local people.
Extreme Forest dependent peoples,degree of dependency and lean period combating procee should be encountered properly.
Government can take some action plan for poor peoples livelihood with the help of NGOs, private and development partners. Such as FAO and USAID can works with the Family Planning Department for awareness the poor people not to make a big family. Sometimes I think how the poor people are living and producing children. In slum area, a big family is residing in a poor room. So if you think about that then we have to work for them at first. We have to assure their less expensive permanent home and government have to take an action that each family could not take more than two child. If any family takes more child, they could not get good opportunities. They do not get government jobs, get admission in govt. educational institutes etc. and they have to pay more taxes to the government's in all sectors.
Yes. Will give a strong idea.If you include socio economic data as well.
How the people surrounding forest benefitted from the forest resources.
The interface between livelihoods-conservation is vital, 'cause most forests are heavily burdened with huge anthropogenic pressures. This inventory might highlight a scenario for 2030, 2050.
Analysis of BFI data and Socio-Economic data will help understanding of how local communities use their forests and it may help understanding forest land contributions to poverty reduction and livelihoods improvement;

What are the implications of the Bangladesh Forest Inventory on Forest governance?
From this inventory requirement should be placed for a good forest governace.
Assessment of present governance status and interventions required in the future.
Forest governance will increase as we will able to identify where to knock?
Conservation award, conservation friendly leadership from forest ministry and forest directorate should be established. Proper acts/rules are needed.
For good governance in Forest Department, all officials should have the integrity in their professions from top to bottom level. In addition, I am discussing earlier that forest department needs more first class officers immediately and there are many lower level staffs who worked in field level under some projects and after completion of those projects they lose their jobs and they do not get salary then they usually involve in corruption with some local influential persons. Therefore, FD has given to priority to employ those persons who has worked earlier under any projects of FD.
Yes. Will give a strong idea.
Good governance Good policy making. Good management.
Social forestry, community forestry, co-management approaches are new dimensions GoB, academia, NGOs are taken in practices; Parallel empirical studies, are required in NFI project to understand socio-ecological contexts of forest governance.
BFI data may provide indicators of weakness in forest sector governance that should be address for sustainable forest resource development.

*The results from the evaluation are derived from 10 respondents.

Appendix 4.   Attendance List

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