Action Plan for Bhutan's National Forest Monitoring System for REDD+ under the UNFCCC

Prepared jointly by Forest Resource Management Division
and
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ROYAL GOVERNMENT OF BHUTAN
Ministry of Agriculture & Forests
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FOREWORD

Bhutan is a Party to the United Nations Framework Convention on Climate Change (UNFCCC) and the Royal Government of Bhutan attaches great importance to climate change issues. Emissions from deforestation and forest degradation from AFOLU (Agriculture, Forestry and Other Land Use) sector is about 24% of global greenhouse gas emissions.

In accordance with the UNFCCC Agreements, developing countries that want to undertake REDD+ activities are required to develop a national strategy or action plan, establish a national forest reference emission level, a robust and transparent national forest monitoring system for the measurement, reporting and verification (MRV) on the performance of the REDD+ activities, and a system for providing information on how the REDD+ safeguards are being addressed and respected.

As part of its REDD+ Readiness programme, Bhutan is preparing to develop a REDD+ strategy to be implemented in accordance with the UNFCCC agreements. The National Forest Monitoring System will form the key component of the REDD+ strategy to help monitor the changes in forest area and carbon stock. Therefore, this Action Plan is being developed to provide a road map of activities to be implemented to establish the NFMS.

I would like to thank the Forest Resource Management Division and Watershed Management Division for coordinating the development of this Action Plan. Thanks are also due to the members of REDD+ TWGs particularly that of REDD+ TWG on NFMS and Reference Emission Level for all their contribution and hard work. Finally, we would like to thank the UN REDD/FAO Programme for financial as well as technical support in preparing the Action Plan.

I am confident that the Action Plan will provide the required guidance for DoFPS in establishing and institutionalizing the NFMS which will help Bhutan to become REDD+ ready. More importantly, the NFMS will enable monitoring of changes in forest cover and ensure a check and balance on sustainability of forest resources.

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LIST OF FREQUENTLY USED ABBREVIATIONS

AD	Activity Data
AFOLU	Agriculture, Forestry and Other Land Use
AP	Action Plan
BTFEC	Bhutan Trust Fund for Environment Conservation
CDM	Clean Development Mechanism
CGISC	Centre for GIS Coordination
CITES	United Nations Convention on International Trade in Endangered Species of Wild Flora and Fauna
COP	Conference of the Parties
CSO	Centralised Statistical Organisation
DNA	Designated National Authority
DoFPS	Department of Forests and Park Services
EF	Emission Factor
FAO	Food and Agriculture Organization of the United Nations
FCPF	Forest Carbon Partnership Facility
FMU	Forest Management Unit
FOLU	Forestry and Other Land Use
FRMD	Forest Resource Management Division
GEF	Global Environment Facility
GHG	Greenhouse gas
GIS	Geographical Information Systems
GNHC	Gross National Happiness Commission
IPCC	Intergovernmental Panel on Climate Change
LDC	Least Developed Country
LECB	Low Emission Capacity Building Project
LULUCF	Land Use, Land Use Change and Forestry
MoAF	Ministry of Agriculture and Forests
MRV	Measurement, Reporting and Verification
MSTCCC	Multi-Sectoral Technical Committee on Climate Change
NAGISC	National Agency for GIS Coordination
NAMAs	Nationally Appropriate Mitigation Actions
NAPA	National Adaptation Program of Action
NCCC	National Climate Change Committee
NEC	National Environment Commission

NECS	National Environment Commission Secretariat
NFI	National Forest Inventory
NFMS	National Forest Monitoring System
NSSC	National Soil Service Centre
PLR	Policies, Legislations and Regulations
R-PP	REDD+ Readiness Preparation Package
RNR-RDC	Renewable Natural Resources Research Development Centre
RSPN	Royal Society for Protection of Nature
SAPA	Sectoral Adaptation Plan for Action
SLMS	Satellite Land Monitoring System
SNC	Bhutan's Second National Communication
SPAL	Soil and Plant Analytical Laboratory
TWG	Technical Working Group
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
WMD	Watershed Management Division

EXECUTIVE SUMMARY

The expected forest climate mitigation mechanism under the United Nations Framework Convention on Climate Change (UNFCCC), REDD+, provides an opportunity for developing countries to be compensated for their emissions mitigation actions in the forestry sector. As countries aiming to participate in REDD+ embark on the phased approach to implementation, they have been requested by the UNFCCC Conference of the Parties (COP) to develop several strategic and technical elements to prepare to implement REDD+ activities. Among these is a national forest monitoring system, which will serve the dual functions of 1) measuring and reporting greenhouse gas (GHG) emissions by sources and removals by sinks in the forest sector (which will subsequently undergo national or international verification); and 2) monitoring the outcomes of REDD+ activities.

This document sets out the actions that Bhutan will undertake, in the context of the provision of adequate and predictable support, including financial resources and technical and technological support, to implement its National Forest Monitoring System (NFMS) for REDD+ activities.

Currently 70.46 % of the land or 27,052.91 km^2 in Bhutan is forested Bhutans's, presenting a prominent opportunity for the country to contribute to global climate change mitigation efforts through the expected REDD+ mitigation process under the UNFCCC, while promoting sustainable development of the country's forestry sector. Moreover, with the focus of REDD+ at the international level set largely on the world's tropical belt, in participating in the REDD+ mitigation process under the UNFCCC, Bhutan will be leading global efforts to ensure equal importance is placed on contributing to climate mitigation through the sustainable management of the world's subtropical and temperate coniferous forests.

The key technical tools that Bhutan will develop to develop and implement its national forest monitoring system are:

1. A Satellite Land Monitoring System;
2. A multipurpose National Forest Inventory;
3. A national GHG inventory for the reporting of emissions and removals from the land use, land use change and forestry sector;
4. A forest monitoring function with associated web-portal for transparent data sharing.

The systems and tools to be developed or improved in Bhutan will be designed to meet international guidelines, such as those set out by the Intergovernmental Panel on Climate Change (IPCC), in order to transparently produce internationally comparable datasets. An assessment of existing capacities in the country reveals certain shortcomings in technical systems that will require addressing through capacity building and development; but also some strong technical foundations that will be built on for the development of the national forest monitoring system (especially the very much advanced national forest inventory, for example).

The key technical tools are supported institutionally by cross-cutting activities with the following outputs:

- Output 1.1 Institutional arrangements agreed and formalized
- Output 1.2 Capacity building delivered to stakeholders

Remote sensing and geographical information systems (GIS) capacities date back to the 1990s. Human resource capacity building was limited to project oriented tasks. National remote sensing and GIS technical capacities are being strengthened in order to assess land use changes across the national territory (point sample approach), to generate activity data for the measurement function of the national forest monitoring system. A wall-to-wall forest monitoring system will also be developed to monitor forest area changes and the implementation of REDD+ actions. A web-GIS platform will be developed to assess the outcomes of REDD+ activities through the analysis of forest cover change. The Satellite Land Monitoring System will be managed by the GIS unit of the Department of Forests and Park Services (given their existing capacities and experience). Key outputs to develop the Satellite Land Monitoring System are:

- Output 2.1 Satellite land monitoring system office set up and strengthened
- Output 2.2 Land use change analysed
- Output 2.3 Satellite land monitoring system web interface developed and launched

The constitution of Bhutan mandates a 60% forest cover of the territory for all times. Bhutan has engaged in a National Forest Inventory (NFI) since 2009, with the core objective to generate information and data required for sustainable forest management and thus serving as an important tool for the government, policy makers and forest managers in ensuring a 60 % forest cover. The NFI implementation is being led by the Forest Resource Management Division (FRMD).Besides collecting forestry parameters, NFI will generate forest carbon

stock and forest carbon stock changes information following international standards. This will facilitate the generation of emission factors for the MRV function. Having started NFI in Bhutan prior to R-PP acceptance, many important activities have been already completed. However, key output implement NFI are:

- Output 3.1 Infrastructure and Institutional developed
- Output 3.2 NFI methodology developed
- Output 3.3 NFI field manuals developed
- Output 3.4 NFI crew formed
- Output 3.5 Existing NFI data centralized
- Output 3.6 NFI fully implemented
- Output 3.7 Data quality monitored
- Output 3.8 Forest carbon stocks data analysed and evaluated
- Output 3.8 Periodic National Forest Inventory carried out and forest carbon assessed

The National Environment Commission Secretariat (NECS) is the focal agency for the UNFCCC. As part of its responsibility to produce Bhutan's National Communications (NCs) and Biennial Update Reports (BURs), NECS will also report on Bhutan's REDD+ actions to the UNFCCC. NECS is the overall National GHG Coordinator and each sector will feed the required data to NECS for national and international reporting. Although FRMD is in the Ministry of Forestry and Agriculture, it will only feed information on the Forestry and Other Land Use (FOLU) sector (referring to the Agriculture, Forestry and Other Land Use, AFOLU, as part of the 2006 IPCC Guidelines for GHG Inventories) to the NECS. Outcomes from the NFI process and the initial analysis of land use changes will be essential in the compilation of the FOLU data for the GHG inventory. Key outputs to support the greenhouse gas inventory for the FOLU sector and reporting for REDD+ are:

- Output 4.1 Capacity for GHG FOLU GHG inventory built
- Output 4.2 FOLU GHG inventory and data management system institutionalized
- Output 4.3 Capacity for data management for FOLU GHG inventory built
- Output 4.4 Periodic reports on FOLU GHG inventory produced

This Action Plan is targeted at stakeholders (government and non-government) involved in technical forest measurement and monitoring in Bhutan. It sets out the details of the elements to be developed through the three phases of REDD+, institutional arrangements and staff requirements, as well as a flow chart of indicative activities towards the development of the national forest monitoring system. Finally, the national forest monitoring system action plan sets out a potential timeline and budget for the implementation of the identified activities.

1 INTRODUCTION

This document has been developed by the Royal Government of Bhutan, with the support of the Food and Agriculture Organization of the United Nations (FAO) through the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD Programme).

The objective of this document is to set out the actions to be taken by Bhutan towards the implementation of its national forest monitoring system (NFMS) for REDD+ activities under the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC Conference of the Parties (COP), through the Warsaw Framework for REDD+ (2013), has set out a number of elements that developing countries aiming to participate in REDD+ should develop. Among them are a national strategy or action plan, a system for providing information on the REDD+ safeguards, a forest reference emission level / forest reference level and a NFMS. This document addresses the development of Bhutan's NFMS.

This document is an Action Plan that will inform the Royal Government of Bhutan's National REDD+ Strategy that will be developed as part of its R-PP with the World Bank's Forest Carbon Partnership Facility (FCPF). It also builds on the relevant section (4) of the R-PP on the design of the NFMS. This Action Plan is targeted at stakeholders (government and non-government) involved in forest measurement, monitoring and reporting in Bhutan.

The introduction sets out the context and objectives of this document. The overarching approach taken by the Royal Government of Bhutan to the development of its NFMS for REDD+ under the UNFCCC will be guided by the approach recommended by the UN-REDD Programme in the document National Forest Monitoring Systems: Monitoring and Measurement, Reporting and Verification (M & MRV) in the context of REDD+ Activities (UN-REDD Programme, 2013)[1].

[1] Given the detailed coverage of REDD+ under the UNFCCC, including the history of negotiations under the UNFCCC and the functions of the national forest monitoring system, in the UN-REDD Programme document, the present document provides merely an overview of these.

1.1 Climate Change and Forests

The steady increase in greenhouse gas (GHG) emissions from human activities over the past 150 years has brought about a change in the atmospheric concentrations of these compounds, exacerbating the greenhouse effect and contributing to global climate change. The impacts of climate change are predicted to be far-reaching, making it a multi-sectoral challenge. For example, shifting weather patterns threaten food production through an increase in unpredictable precipitation; rising sea levels threaten to contaminate coastal freshwater reserves and increase the risk of flooding; and a warming atmosphere could aid the spread of plant pest infestations.

The international response to concerns over climate change was the creation of the United Nations Framework Convention on Climate Change (UNFCCC), an environmental treaty with the objective of stabilising GHG concentrations in the atmosphere at a level that would prevent dangerous interference with the climate system, in 1992 (UNFCCC, 1994). Responses to climate change under the UNFCCC fall into one of two categories: mitigation (i.e. reducing human GHG emissions) and adaptation to the projected impacts. The responsibility for mitigation has to date largely fallen on developed countries (Annex 1 Parties under the UNFCCC), given their historical responsibility for atmospheric GHG concentrations, though in recent years the mitigation roles and responsibilities of developing countries (non-Annex 1 Parties) have come under increasing scrutiny.

Forests are the largest terrestrial store of carbon and constantly remove carbon dioxide (CO_2) – the most common GHG – from the atmosphere through photosynthesis. Nevertheless, human activities, such as the conversion and degradation of forests, result in considerable GHG emissions. According to the Intergovernmental Panel on Climate Change (IPCC), from 1750 to 2011, CO_2 emissions from fossil fuel combustion and cement production have released 375 [345 to 405] GtC to the atmosphere, while deforestation and other land use change are estimated to have released 180 [100 to 260] GtC. This results in cumulative anthropogenic emissions of 555 [470 to 640] GtC (IPCC, 2013 – summary for policy makers[2]).

[2] Please see: http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_SPM_FINAL.pdf

According to the IPCC, emissions from the forestry sector, through deforestation and forest degradation, accounted for 9-11% of global human GHG emissions between 2000-2012 (IPCC, 2014), with the majority of this contribution originating in developing countries. For this reason, and the fact that forests can sequester atmospheric GHG, the UNFCCC has targeted forestry as an important area for climate change mitigation.

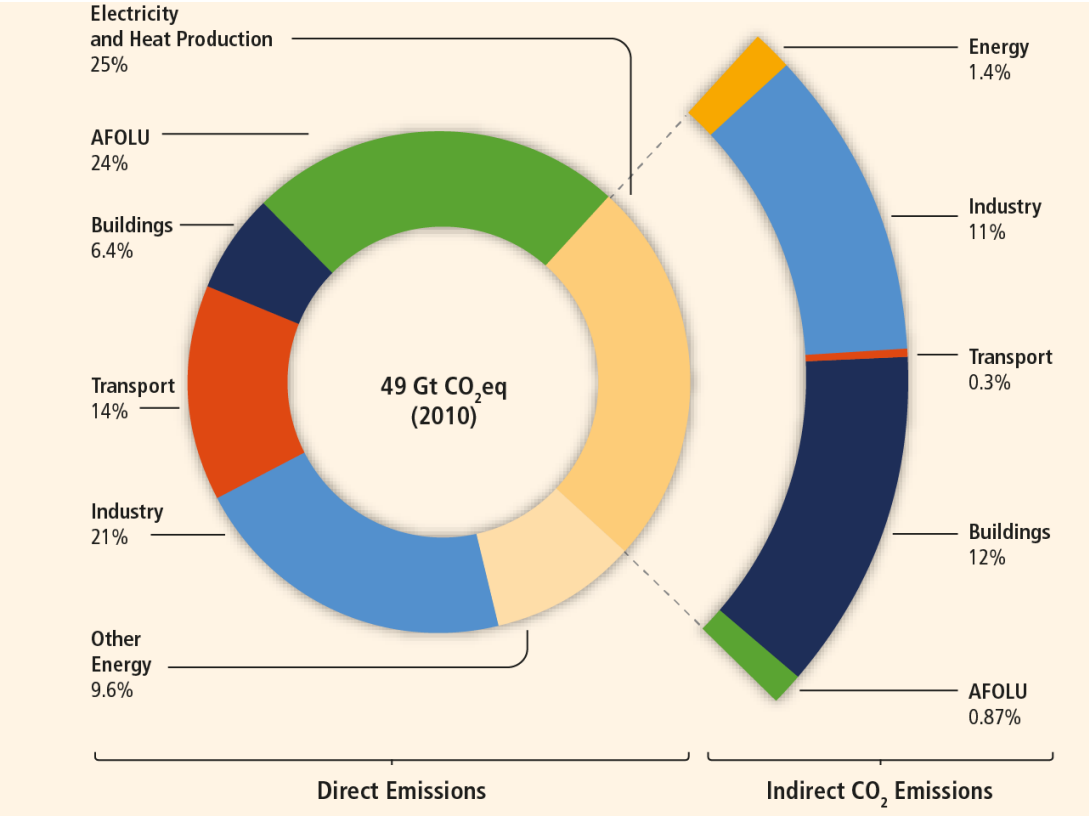


Figure 1 Total anthropogenic GHG emissions (GtCO2eq / yr) by economic sectors.

Inner circle shows direct GHG emission shares (in % of total anthropogenic GHG emissions) of five economic sectors in 2010. Pull-out shows how indirect CO_2 emission shares (in % of total anthropogenic GHG emissions) from electricity and heat production are attributed to sectors of final energy use. 'Other Energy' refers to all GHG emission sources in the energy sector. The emissions data from Agriculture, Forestry and Other Land Use (AFOLU) includes land-based CO_2 emissions from forest fires, peat fires and peat decay that approximate to net CO_2 flux from the Forestry and Other Land Use (FOLU) sub-sector. Source: IPCC Fifth Assessment Report, Summary for policy makers.

1.2 REDD+ under the UNFCCC

As part of international efforts to mitigate climate change, REDD+ aims to provide positive incentives to developing countries to undertake mitigation activities related to forests. In addition to reducing emissions from deforestation and degradation, the UNFCCC COP decided to include the conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks. This wide scope allows broad participation by non-Annex I Parties.

Negotiations on REDD+ can be traced back to the 11th session of the UNFCCC COP, Montreal, in 2005, where it was raised as an agenda item that initiated a two-year process under the UNFCCC's Subsidiary Body for Scientific and Technological Advice (SBSTA), including several technical workshops on the issue. This lead to the introduction of REDD+ as part of the Bali Action Plan at COP13 in 2007 as: "*reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries*" (Decision 1/CP.13). Decision 2/CP.13 also provides some early methodological guidance. The discussions in Bali represented a shift in approach under the UNFCCC from just Annex I countries implementing mitigation actions to all Parties doing so, and hence laid the foundations to encourage non-Annex I Parties to implement Nationally Appropriate Mitigation Actions (NAMAs) that can be Measured, Reported and Verified (MRV-able).

REDD+ decisions under the UNFCCC have been adopted progressively since the 13th COP in Bali, with all subsequent decisions to date constituting the set of provisions (guidance, rules and modalities) that guide the implementation of REDD+. During the COP 15 meeting of the UNFCCC in Copenhagen in 2009 several principles and methodological guidelines were defined through the adoption of Decision 4/CP.15 entitled "*Methodological guidance for activities relating to reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries*".

Parties at COP16 in Cancun, December 2010, adopted Decision 1/CP.16 (the so called Cancun Agreements), section C: "*Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries*". The scope

of REDD+ was agreed in Cancun and the five activities are set out in Decision 1/CP.16, paragraph 70:

"Encourages developing country Parties to contribute to mitigation actions in the forest sector by undertaking the following activities, as deemed appropriate by each Party and in accordance with their respective capabilities and national circumstances:

- *Reducing emissions from deforestation;*
- *Reducing emissions from forest degradation;*
- *Conservation of forest carbon stocks;*
- *Sustainable management of forests;*
- *Enhancement of forest carbon stocks."*

The broad scope of activities was agreed in order to reflect the wide range of countries' national circumstances (e.g. high forest cover and high deforestation / high forest cover and low deforestation / expanding forest areas and corresponding carbon stocks).

A phased approach to REDD+ implementation, as adopted by the UNFCCC COP through decision 1/CP.16, can facilitate an iterative approach and thus address and ameliorate the complexities that may arise with REDD+ implementation. Paragraph 73 of this decision states:

[The COP] "Decides that the activities undertaken by Parties [...] should be implemented in phases, beginning with the development of national strategies or action plans, policies and measures, and capacity-building, followed by the implementation of national policies and measures and national strategies or action plans that could involve further capacity-building, technology development and transfer and results-based demonstration activities, and evolving into results-based actions that should be fully measured, reported and verified".

The phased approach also recognises the importance of national circumstances for the implementation of REDD+ activities in decision 1/CP.16, paragraph 74: *"Recognizes that the implementation of the [REDD+] activities ... including the choice of a starting phase as referred to in paragraph 73 above, depends on the specific national circumstances, capacities and capabilities of each developing country Party and the level of support received".*

The phased approach to REDD+ implementation is illustrated in Figure 2.

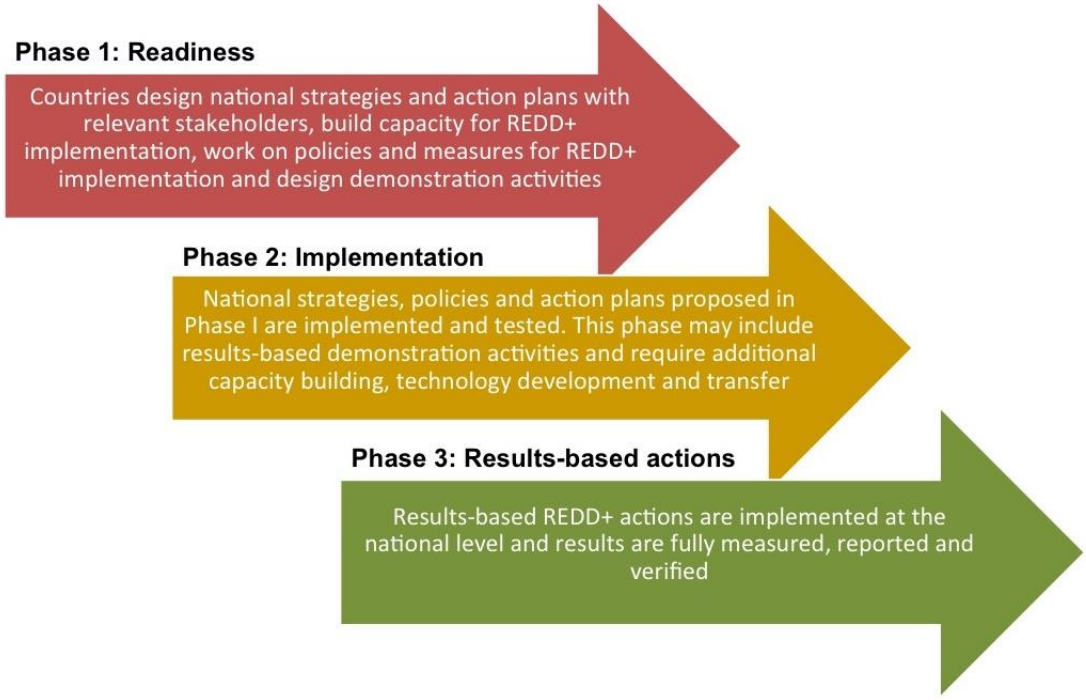


Figure 2 Description of the three phases of REDD+ implementation.

Paragraph 73 outlines the activities to be undertaken in each of the three phases as follows:

1. **Phase 1**: "*Development of national strategies or action plans, policies and measures, and capacity-building*". Activities here focus on capacity building and development, awareness raising and implementation planning, as well as the preparation of documents such as the present one, to describe the steps that need to be taken to develop and implement necessary the technical systems.
2. **Phase 2**: "*Implementation of national policies and measures and national strategies or action plans that could involve further capacity-building, technology development and transfer and results-based demonstration activities*". This is a piloting, testing and refining phase, using the results of demonstration activities to refine methodologies and systems; and using these to inform the development of national REDD+ policies, measures and national strategies.
3. **Phase 3**: "*Evolution of all the REDD+ activities into results-based actions that should be fully measured, reported and verified*". National REDD+ policies and

measures are implemented across the country, and REDD+ is integrated with other mitigation mechanisms under the UNFCCC.

In the description of the second phase of REDD+ implementation, paragraph 73 of decision 1/CP.16 refers to 'demonstration activities'. Paragraph 4 of decision 2/CP.13 (adopted in 2007) refers to an annex of the same decision encouraging Parties to use the indicative guidance it contains as an aid in undertaking and evaluating the range of demonstration activities designed to address the drivers of deforestation relevant to national circumstances, with a view to reducing emissions from deforestation and forest degradation and thus enhancing forest carbon stocks through the sustainable management of forest. This guidance is listed below:

1. *"Demonstration activities should be undertaken with the approval of the host Party.*
2. *Estimates of reductions or increases of emissions should be results based, demonstrable, transparent and verifiable, and estimated consistently over time*
3. *The use of the methodologies described in paragraph 6*[3] *of this decision is encouraged as a basis for estimating and monitoring emissions.*
4. *Emission reductions from national demonstration activities should be assessed on the basis of national emissions from deforestation and forest degradation.*
5. *Subnational demonstration activities should be assessed within the boundary used for the demonstration, and assessed for associated displacement of emissions.*
6. *Reductions in emissions or increases resulting from the demonstration activity should be based on historical emissions, taking into account national circumstances.*
7. *Subnational*[4] *approaches, where applied, should constitute a step towards the development of national approaches, reference levels and estimates.*
8. *Demonstration activities should be consistent with sustainable forest management, noting, inter alia, the relevant provisions of the United Nations Forum on Forests, the United Nations Convention to Combat Desertification and the Convention on Biological Diversity.*
9. *Experiences in implementing activities should be reported and made available via*

[3] *"Encourages the use of the most recent reporting guidelines as a basis for reporting greenhouse gas emissions from deforestation, noting also that Parties not included in Annex I to the Convention are encouraged to apply the Good Practice Guidance for Land Use, Land-Use Change and Forestry".*

[4] *"Activities carried out within the national boundary"* (a distinction between sub-national and jurisdictional is made later in this document).

the Web platform.

10. *Reporting on demonstration activities should include a description of the activities and their effectiveness, and may include other information.*
11. *Independent expert review is encouraged".*

1.3 National forest monitoring systems

The UN-REDD Programme has developed a comprehensive document on '*National Forest Monitoring Systems: Monitoring and Measurement, Reporting and Verification (M&MRV) in the context of REDD+ activities*', which can be found here. This section is largely based on information provided in that document – noting that it was published in mid-2013 and there does not fully cover the more recent UNFCCC decisions including the Warsaw framework from COP19 in November 2013.

Guidance from the UNFCCC on national forest monitoring systems has been published cumulatively, meaning that there is no single source of comprehensive information on how to develop these systems. To date, four documents provide guidance on this element: Decision 4/CP.15 (from the Copenhagen Accords), Decision 1/CP.16 (from the Cancun Agreements), Decision 11/CP.19 and Decision 14/CP.19 (from the Warsaw Framework).

Decision 4/CP.15, adopted at COP15 in 2009, provides methodological guidance on REDD+. Part of this guidance relates to the need for a national forest monitoring system. Here, developing country Parties are requested to:

- Paragraph 1(d): *… establish, according to national circumstances and capabilities, robust and transparent* ***national forest[5] monitoring systems*** *and, if appropriate, sub-national systems as part of national monitoring systems that:*
  - *i) Use a combination of remote sensing and ground-based forest carbon inventory approaches for estimating, as appropriate, anthropogenic forest-related greenhouse gas emissions by sources and removals by sinks, forest carbon stocks and forest area changes;*
  - *ii) Provide estimates that are transparent, consistent, as far as possible accurate, and that reduce uncertainties, taking into account national capabilities and capacities;*

[5] "*Taking note of, if appropriate, the guidance on consistent representation of land in the Intergovernmental Panel on Climate Change Good Practice Guidance for Land Use, Land-Use Change and Forestry.*"

iii) Are transparent and their results are available and suitable for review as agreed by the Conference of the Parties.

Decision 4/CP.15 also specifies that countries must follow the most recent methodological recommendations issued by the IPCC, serving as a basis for estimating the sources of anthropogenic GHG emissions, and their removal by sinks, and for measuring carbon stocks and changes in forest area. In this way, emissions estimates will be based on common (IPCC) methodological approaches. This methodological guidance indicates that national forest monitoring systems should be used to: 1) estimate emissions and removals from the forest sector (measurement); 2) report the performance of REDD+ activities to the UNFCCC through the national communication (reporting); and 3) allow verification of the results by the UNFCCC Secretariat (verification) – i.e. to fulfil the MRV function for REDD+ activities.

UNFCCC guidance on this technical element for REDD+ is built upon in Decision 1/CP.16. Here developing countries aiming to participate in REDD+ are requested to develop:

- Paragraph 71(c): *A robust and transparent* ***national forest monitoring system*** *for the monitoring and reporting of the [REDD+] activities referred to in paragraph 70 above, with, if appropriate, subnational monitoring and reporting as an interim measure, in accordance with national circumstances, and with the provisions contained in decision 4/CP.15.*

The UN-REDD document elaborates that an NFMS for REDD+ can serve simultaneous functions: a 'MRV' function and a 'monitoring' function (see Figure 3). The process of developing an NFMS should allow for incremental efforts to improve performance in recognition of countries' varied capabilities and national circumstances. In order to follow an iterative development and implementation process with well-defined steps and results a NFMS for REDD+ should:

a) Be robust, transparent, and aim to be implemented at the national level, with subnational monitoring systems as a potential interim measure;
b) Be in line with relevant decisions of the UNFCCC on REDD+, notably decisions 4/CP.15, 1/CP.16, 11/CP.19 and all other subsequent decisions adopted by the COP;
c) Be relevant for the phased approach for REDD+ activities as set out by the UNFCCC (decision 1/CP.16, paragraph 73).

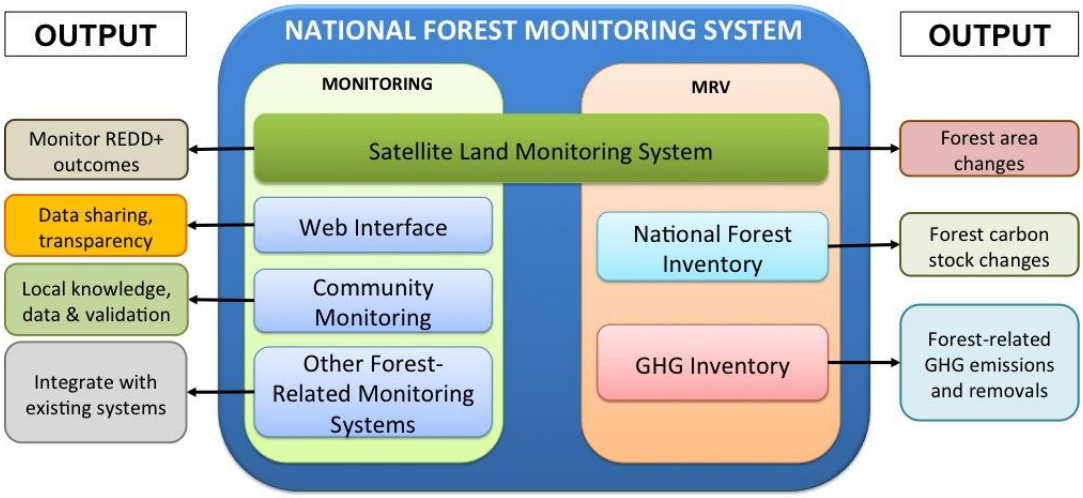


Figure 3 The UN-REDD Programme's interpretation of the dual functions of the NFMS for REDD+

Decision 11/CP.19 covers the modalities for NFMS, reinforcing that the primary function of the NFMS is MRV of REDD+ activities. Key elements of the Warsaw Framework NFMS decision text are that NFMS should:

- Provide data and information that are transparent, consistent over time, and suitable to be measured, reported and verified (MRV);
- Build upon existing systems while being flexible and allowing for improvement, reflecting the phased approach to REDD+ implementation (see Figure 5);
- Provide, as appropriate, relevant information for national systems for the provision of information on how the REDD+ safeguards are addressed and respected.

1.3.1 MRV function

MRV can be interpreted as the means to addresses countries' commitments to collect and share information on the progress of the implementation of provisions and/or commitments of Parties, according to Article 4.1 (a) of the Convention, to "*Develop, periodically update, publish and make available to the Conference of the Parties, in accordance with Article 12, national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies to be agreed upon by the Conference of the Parties.*"

In the context of REDD+, MRV is the process that countries will need to follow in order to estimate the performance of REDD+ activities in mitigating climate change – i.e. the emissions reductions and forest carbon stock enhancements – in terms of tonnes of carbon dioxide equivalents per year (tCO_2e/yr). Because of this critical role in ensuring the environmental integrity of REDD+, MRV of REDD+ results is a pre-condition to countries receiving results-based payments for results-based actions (i.e. MRV is the mechanism to assess whether actions are results-based).

The three technical pillars or building blocks of the NFMS that are essential to support the MRV function are:

- Pillar 1: A Satellite Land Monitoring System (SLMS) - including other remote sensing products such as for example Landsat satellite data – to collect and assess, over time, the Activity Data (AD) related to forest land;
- Pillar 2: National Forest Inventory (NFI) to collect information on forest carbon stocks and changes, relevant for estimating emissions and removals and to provide emissions factors (EF);
- Pillar 3: A national GHG Inventory as a tool for reporting on anthropogenic forest-related GHG emissions by sources and removals by sinks to the UNFCCC Secretariat.

To ensure that countries report their national GHG inventories in a transparent, accurate, complete, comparable and consistent manner, the UNFCC COP has requested countries to use the most recent IPCC guidance and guidelines to estimate anthropogenic forest-related greenhouse gas emissions by sources and removals by sinks, forest carbon stocks and forest area changes. IPCC guidance and guidelines relate mainly to the Measurement and Reporting aspects of the MRV component of a NFMS. The UNFCCC has created a separate page on its REDD web platform[6] with links to the relevant IPCC guidelines and good practice guidance that should form the basis for how developing countries estimate and report on emission reductions from deforestation and forest degradation and changes in forest carbon stocks, as requested of Parties in decision 4/CP.15 paragraph 1(c) (Table 1)

[6] https://unfccc.int/methods/redd/redd_web_platform/items/6734.php

Table 1 Overview of IPCC Guidelines and Good Practice Guidance that could be relevant to estimate emission reductions from deforestation and forest degradation and changes in forest carbon stocks

IPCC Guidance	
IPCC-NGGIP[7]	IPCC-National Greenhouse Gas Inventories Programme
2006 IPCC Guidelines[8]	2006 IPCC Guidelines for National Greenhouse Gas Inventories (5 Volumes)
GPG-LULUCF 2003[9]	Good Practice Guidance for Land Use, Land-Use Change and Forestry
Degradation of Forest[10]	Definitions and Methodological Options to Inventory Emissions from Direct Human-induced Degradation of Forests and Devegetation of Other Vegetation Types
GPG2000[11]	Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (accepted and published 2000)
Revised 1996 IPCC Guidelines[12]	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (3 Volumes) (approved in 1996 and published in 1997)
Revised 1996 IPCC Guidelines Software[13]	IPCC Greenhouse Gas Inventory Software for the Workbook (published in 1997; Microsoft Excel 5.0c or later version is necessary)
-	IPCC Guidelines for National Greenhouse Gas Inventories (3 Volumes) (approved in 1994 and published in 1995, out of print, replaced by 1996 Revised Guidelines)

The UNFCCC encourages countries to follow the IPCC Good Practice Guidance (GPG) for "land use, land use change and forestry" (LULUCF) as the basis for compiling their GHG inventory reports. GPG sets out a simple methodological approach for the development of GHG inventories: to combine information on the extent of human activities (or activity data – AD) with coefficients that quantify the emissions or removals per unit activity (or emission factors – EF) (Figure 4).

[7] http://www.ipcc-nggip.iges.or.jp/
[8] http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html
[9] http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html
[10] http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/degradation.html
[11] http://www.ipcc-nggip.iges.or.jp/public/gp/english/
[12] http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html
[13] http://www.ipcc-nggip.iges.or.jp/public/gl/software.html

For further guidance on emission factors and activity data, see the UN-REDD NFMS guidance document and Hewson et al. (2013)[14].

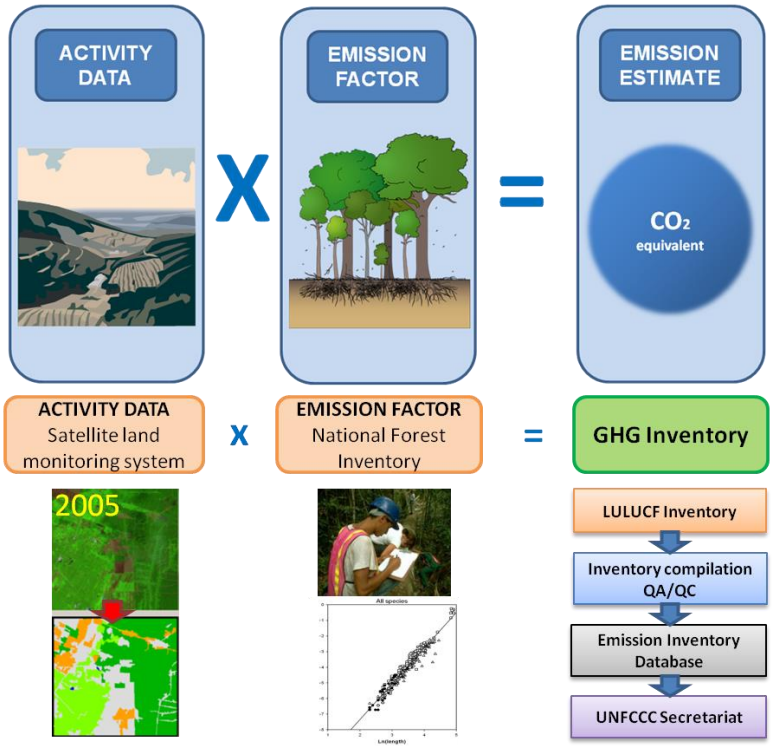


Figure 4 The IPCC's methodological approach to calculate anthropogenic GHG emissions by sources and removals by sinks related to forest land

1.3.2 Monitoring function

The "monitoring" function of the NFMS can be primarily considered a domestic tool to allow countries to assess a broad range of forest information, including in the context of REDD+ activities. The monitoring function can be implemented through a variety of methods and serve a number of different purposes, depending on national circumstances, but in the REDD+ context it is likely to focus on the impacts and outcomes of 1) demonstration activities carried out during the second phase of REDD+ and 2) national policies and measures for REDD+ in the third phase of REDD+.

Each element of this equation represents a pillar of work, while the monitoring function will be nationally specific, and may encompass both REDD+-specific and

[14] Hewson, J., Steininger, M. and Pesmajoglou, S., eds. (2013). REDD+ Measurement, Reporting and Verification (MRV) Manual. USAID-supported Forest Carbon, Markets and Communities Program. Washington, DC, USA.

non-REDD+ needs. The focus, however, should be on two REDD+-specific monitoring aspects:

1. Monitoring to assess the performance of REDD+ demonstration activities in Phase 2;
2. Monitoring of the performance of national REDD+ policies and measures in Phase 3.

It is important to acknowledge that the performance of REDD+ activities, policies and measures can be assessed both through direct measurement of emissions stocks / removals and indirectly through a series of proxy indicators (e.g. forest canopy changes, forest certification schemes, etc.).

It is important to define criteria and indicators to be measured on a regular basis to assess the progress made in the implementation of policies and measures that a country has chosen to use to comply with its commitments under the UNFCCC. The indicators may be pre-existing (environmental, economic indicators, social, legal) and have a direct or indirect link with REDD+ activities, and / or adopt more strict definitions explicitly related to the implementation of REDD+ activities.

As Figure 3 indicates, the monitoring function of the NFMS can include broader forest-related elements including community monitoring and traditional forestry monitoring systems. Community monitoring can, if appropriate to national circumstances, form an important part of the monitoring system as communities can provide ground-level information (e.g. tree counts and locations, delimitation of community forest areas), which can be uploaded into the web-GIS (web-Geographical Information Systems) interface of the monitoring system. Consultations with communities and other local stakeholders regarding the role(s) that communities can, and are willing to, play in the national forest monitoring system should take place prior to determining this component. Traditional forestry monitoring systems are also an important consideration because the national forest monitoring system aims to build on existing systems and to be based on national circumstances; these can therefore also be incorporated into the monitoring function for REDD+.

1.3.3 Phased implementation of the NFMS

The three pillars of the NFMS can be developed along the three phases for REDD+ described in decision 1/CP.16, allowing for the implementation of Results-Based Actions in Phase 2 and the full MRV of REDD+ Results-Based Actions in Phase 3

(Figure 5). Following this strategy, each phase aims to strengthen capacities and prepare for the next phase, resulting in a degree of overlap between phases, notably in terms of capacity building. In Phase 2, monitoring for REDD+ becomes operational, through the SLMS and other relevant proxies. The transition into Phase 3 is achieved by monitoring REDD+ activities at the national level, a National Forest Inventory (NFI) to produce EFs and a national inventory of estimates of forest related GHG emissions and removals. Monitoring for REDD+ can be visualised throughout the REDD+ Phases as presented in Figure 5.

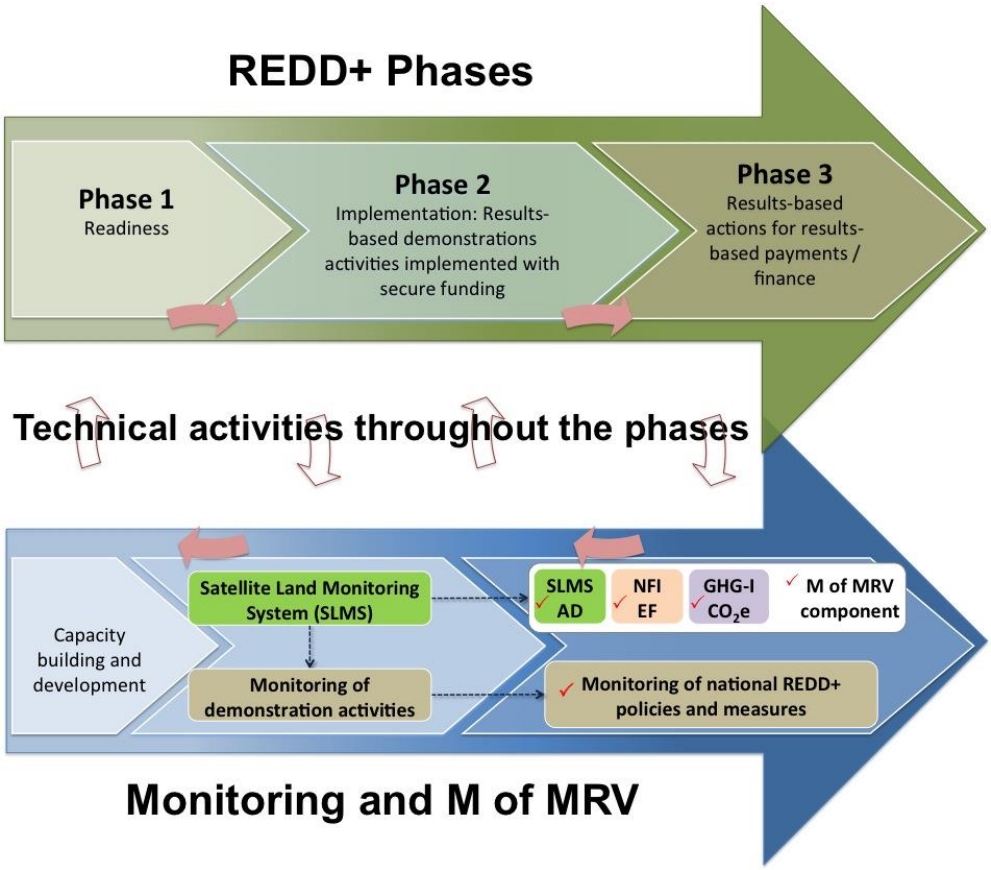


Figure 5 Phased implementation of the NFMS

1.4 Objectives and guiding principles

This document sets out the specific actions, to be developed under the national REDD+ strategy and institutional framework, that Bhutan will undertake, in the context of adequate international (bi-lateral and multi-lateral) support, to implement the technical functions and systems for its national forest monitoring system for REDD+ under the UNFCCC. Emphasis is placed on the delineation of institutional arrangements for each of the elements and functions, building on

existing national capacities. The approach and steps set out in this document are guided by a number of key policy and technical principles. The policy principles are the following:

1. National ownership: Bhutan will have full control of all REDD+-related processes. International organisations or foreign institutions can provide support for technical capacity building and institutional capacity development.
2. Support to UNFCCC process: Bhutan will develop systems for REDD+ as set out under the UNFCCC, and will incorporate REDD+ into national policies and legislation.
3. Autonomy: Bhutan will develop the necessary technical functions and systems according to national circumstances, capabilities and priorities.
4. Responsibility: Bhutan will be fully and solely responsible for the implementation of its national forest monitoring system for REDD+.

A number of technical principles will guide national institutions in implementing the activities described in this document. The aim of these principles is to establish a learning-by-doing process with set milestones and deliverables. The principles are the following:

1. Nationally tailored: The national forest monitoring system will be robust, flexible, transparent and country-driven, to allow adjustment to national circumstances.
2. Centrally coordinated, standardized and scalable top-down system: The institutions responsible for technical functions and systems under the national forest monitoring system will define standardised methodology protocols and agree on data supply plans with data suppliers.
3. Leverage of existing competencies, capacities and information.
4. IPCC compliance: The national forest monitoring system will be in line with the most recently adopted or recommended IPCC Guidance and Guidelines.
5. Cost-efficiency: Activities will seek out the most cost-effective solutions at all stages and structural levels.
6. Multiple benefits: The national forest monitoring system will go beyond carbon and become a multifunctional instrument, aiming to serve as a guide for social, economic and environmental policies and provide information on forestry-related fields such as biodiversity. The system should be flexible enough to serve different purposes, for example, reporting on the needs of donors as well as to the UNFCCC.
7. Phased approach: Following the three phases of REDD+, development and implementation of the national forest monitoring system will be undertaken in three distinct phases.

2 CURRENT STATUS OF CLIMATE CHANGE IN BHUTAN

In 1995, Bhutan ratified the United Nations Convention on Biological Diversity (UNCBD) and the UNFCCC. Subsequently, Bhutan also became a member of the United Nations Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) in 2002, the United Nations Convention to Combat Desertification (UNCCD) in 2003, and the Ramsar Convention on Wetlands in 2012.

In 1995, RGoB designated the National Environment Commission (NEC) as the focal point to the UNFCCC and UNCBD. NEC is also the Designated National Authority (DNA) of the Clean Development Mechanism (CDM) of the Kyoto Protocol. Two mini hydropower projects and one medium-sized hydropower plant are being implemented/constructed under the CDM.

Bhutan submitted its First National Communication to the UNFCCC Secretariat in 2000. Bhutan's Second National Communication (SNC) Report, submitted in November 2011, is the country's most recent official communication to the UNFCCC and provides a comprehensive report of actions taken by Bhutan as required under the UNFCCC, including an assessment of national circumstances related to climate change, vulnerability to climate change, capacity building and technology needs and the implementation of climate change- related policies. The SNC also includes a national GHG inventory, which details the emissions and removals of GHGs from all sectors of the economy.

In 2006, Bhutan was one of the first Least Developed Country (LDC) members to prepare and submit a National Adaptation Program of Action (NAPA) to the UNFCCC. Bhutan's NAPA 2012 is a report of prioritized adaptation activities/actions that are needed to address the impacts of climate change. The activities focus mainly on landslide management and flood prevention, reduction of disaster risks through intervention, provision of emergency medical services to vulnerable communities and enhancement of the national capacity for weather and seasonal forecasting in Bhutan. In 2009, Bhutan developed its National Action Program to Combat Land Degradation for the UNCCD and its Biodiversity Action Plan III for UNCBD.

In order to coordinate climate changes issues in Bhutan and in response to climate change, a high level National Climate Change Committee (NCCC) was established. The Prime Minister of Bhutan chairs the NCCC, which comprises of four ministers,

one Member of Parliament, two members from Non- Governmental Organizations (NGOs) and the Secretary of NEC as the member secretary (see Table 1a- 5).
Under the NCCC, a committee known as Multi-Sectoral Technical Committee on Climate Change (MSTCCC) (see Figure 1a-2; Table 1a-5) is in charge of coordinating climate change issues in the country. MSTCCC has representatives from several government agencies, NGOs and associations. The purpose of the MSTCCC is to serve as an official national forum for discussion and coordination of matters related to climate change in Bhutan and to make recommendations ensuring smooth implementation of climate change activities, policies and programs for consideration by the NCCC. The recommendations of the committee are also shared with the Gross National Happiness Commission (GNHC). The MSTCCC is chaired by the Secretary, NEC.

The RGoB has developed the Sectoral Adaptation Plan for Action (SAPA) that will serve as the strategic plan for climate change adaptation, in line with the Vision 2020 (Planning Commission, 1999), the RNR 11th FYP and Bhutan NAPA 2012. SAPA focuses on coping and dealing with the consequences of climate change, such as the effects of rising temperature on glaciers, the effects of changing rainfall patterns on crop productivity, and the effects of these changes on livelihoods.

2.1 Current Status of REDD+ in Bhutan

2.1.1 Background

The REDD+ Programme was introduced in Bhutan through a two-day seminar in Thimphu in June 2010 with support from the UN-REDD Programme. The seminar was also used as a platform to raise the awareness of relevant stakeholders. Subsequently, several awareness workshops were organized at national (see Annex 4, 9.4) and sub-national levels (see Annex 5, 9.5), targeting a diverse range of government and civil society organizations, along with local communities living in and around forest areas. The series of awareness programmes on REDD+ at the national level and sub-national level has helped in communicating the message on REDD+ to the most important stakeholders.

Following the seminar on REDD+ at the National level in 2010, a scoping study on the feasibility of REDD+ in Bhutan was carried out with the support from SNV.

2.1.2 Participation in international REDD+ readiness Programmes

Bhutan prepared and submitted its R-PP for the REDD+ Readiness phase to the FCPF (Forest Carbon Partnership Facility) of the World Bank on July 31, 2013. WMD coordinated the preparation of the R-PP starting from April 2013 with policy and technical guidance from the REDD+ Technical Working Group (TWG) formed in 2012 (see Annex 6, 9.6) and with financial support from UNDP. The R-PP was revised and submitted again on 8 November 2013. The R-PP was formally presented at the 16th Participants Committee Meeting held at Geneva in December 12-16, 2013 where it was approved for a funding of USD 3.8 million from the FCPF. The World Bank is the delivery partner for the FCPF funds. In addition, Bhutan has also received support from GIZ, ICIMOD and the UN-REDD Programme to implement REDD+ Readiness activities. These additional funds complement and supplement works carried out through FCPF funds.

The REDD+ readiness programme in Bhutan is scheduled from July 2014 to June 2018. It has three major components:

1) REDD+ Leadership Development;
2) REDD+ Information Infrastructure and;
3) REDD+ Management.

While components 1 and 3 of the REDD+ Readiness Project will be implemented by WMD, component 2 will be implemented by FRMD. The main goals and objectives of the REDD+ Readiness Programme in Bhutan are to:

- Prepare Bhutan to engage in, and benefit from, the potentially emerging performance-based system from REDD+;
- Strengthen the existing forest policy and management systems, information and data, participatory methods and other human and institutional capacity of direct use in the management and development of forests in Bhutan.

2.1.3 Status of REDD+ Readiness activities

The REDD+ Readiness Programme took off with funding support of USD 245,000 from the UN-REDD Targeted Support programme of 2014 (official request can be found in Annex 1, see 9.1), including:

- National REDD+ governance;
- National systems for transparent, equitable, credible and accountable management of REDD+ funding;

- Engagement of Indigenous Peoples, Local Communities and Other Relevant Stakeholders;
- Ensuring Multiple benefits of Forests and REDD+;
- REDD+ as a catalyst for transformations to a Green Economy;
- MRV and NFMS (including work on this current NFMS AP).

The activities described below are being undertaken with the UN-REDD Programme Targeted Support.

2.1.3.1 Corruption Risk Assessment for REDD+ in Bhutan

For countries preparing to participate in the future REDD+ mitigation process under the UNFCCC, corruption is an important factor to understand drivers of deforestation and forest degradation. Existing corruption problems may undermine the implementation of REDD+, while REDD+ implementation process of implementing REDD+ activities could generate new problems, particularly with the sharing of resulting benefits. If carefully conducted, anti-corruption work in the early stages of developing and implementing national REDD+ programmes may help avoid these problems and ensure REDD+ activities are implemented effectively (WMD Draft document, 2014).

In this context, a study is currently being undertaken by WMD with guidance from the REDD+ Task Force and TWGs, with technical and financial support from the UN-REDD Programme (lead by UNDP). The study includes the review of relevant literature, interviews and regional consultation workshops narrowed down to three main areas of concern in the forestry sector related to REDD+. They are (i) rural timber and related issues; (ii) governance in community forestry and; (iii) illegal logging and general forest crimes. The study looks at the past trend, present scenario and risks and vulnerabilities of these key areas for informing the implementation of the REDD+ Readiness Programme.

2.1.3.2 Stakeholder Engagement and Consultation Guidelines

One of the important elements of REDD+ is that it should be an inclusive and participatory process to involve all relevant stakeholders. This is particularly important for marginalised communities so that they are not negatively impacted by the implementation of REDD+ activities. To ensure that all voices are heard and rights respected, it is critical to design a consultation plan in the early stage of REDD+ Readiness process for ensuring effective communication and engagement

of stakeholders at all levels. Therefore, a stakeholder engagement and consultation guideline is being developed.

2.1.3.3 Review of Policies, Legislations and Regulations (PLR) for REDD+ Safeguards

Parties to the UNFCCC also need to provide a summary of information to receive performance-based payments. For this, a safeguard information system will be developed and integrated into the NFMS. To start with, a review of PLRs relevant to the Cancun Safeguards is being carried. A workshop will be conducted in early 2015 with financial and technical support from the UN-REDD Programme (lead by UNEP) to discuss and develop initial ideas of Bhutan's approach to REDD+ Safeguards.

2.1.3.4 Action Plan for National Forest Monitoring System (NFMS-AP)

The NFMS-AP is developed by FRMD, in collaboration with WMD, and with guidance from the TWG on NFMS, the REDD+ Task Force and other two TWGs with financial as well as technical support from the UN-REDD Programme (lead by FAO). It details the programme of activities to be undertaken to establish the NFMS which will help furnish information for MRV when implementing REDD+ activities and / or when receiving results-based-payments.

3 ACTION PLAN DEVELOPMENT METHODOLOGY

The AP for the implementation of a NFMS is undertaken in the context of Bhutan's overall REDD+ policy. The activities in this AP are based on the guidelines set out principles in Component 4a of Bhutan's National REDD+ Readiness Roadmap. This AP describes in detail all the activities required to operationalize the systems/tools described in the Roadmap. This AP has been developed in accordance with the three steps outlined below.

3.1 Step 1: Establishment of a national NFMS / MRV working group

The implementation of REDD+ Readiness in Bhutan is guided by a National REDD+ Task Force and Three Technical Working Groups (see Annex 2, 9.2) which were established along with the preparation and approval of R-PP document in December 2013. The TWG on NFMS along with Team Leaders of TWG on Strategy Options and TWG on Safeguards, BDS and Governance and other senior officials under DoFPS (see Annex 3, 9.3) were involved in during the workshop which was conducted in July, 2014. The main objective of the workshop was to create an awareness on NFMS-AP and its process of development. During the workshop, the operational modalities, roles and responsibilities of the working group and its members were discussed, refined and validated.

3.2 Step 2: Consultation and drafting of the AP

The first workshop was followed by another TWG meeting in August 2014 and several brainstorming sessions within the core group.

After evaluation of the proposed AP format, the working group supported the drafting of the AP, with support from FAO / UN-REDD, and building on Bhutan's R-PP. The first draft of AP was shared with all stakeholders for comments in November 2014, and the second draft was finalised in December 2014.

3.3 Step 3: Validation of AP

After incorporating stakeholder comments and following a review of the AP by independent experts, a national AP workshop will be delivered in January 2015 to bring together all REDD+ stakeholders and validate the document. The document will then be endorsed by the DoFPS and / or MoAF.

4 NATIONAL CIRCUMSTANCES RELATED TO THE FOREST SECTOR

Bhutan is a small mountainous landlocked country located in the Eastern Himalayas (Figure 6). It has a geographical area of 38,394 km^2 and a population of 0.734 million[15]. The country is characterised by fragile mountainous ecosystem with elevations ranging from about 100m in the foothills to over 7,500m towards the north all within a range 170 km from the northern to the southern border. The east-west dimension of the country measures around 300km. High, rugged mountains, glaciers and moraines, deep valleys and ravines and depressions earmarking watercourses, drainage basins and waterfalls characterize Bhutan's physical features. The most dominant land cover is forest, making up 70.46 % of the land area, while shrubs account for 10.43 %, and cultivated agricultural land and meadows account for 2.93 % and 4.10 %, respectively. Snow cover constitutes 7.44 % while bare areas constitute 3.20 %. Degraded areas, water bodies, built up areas, marshy areas and non-built up areas constitute less than 1 % each[16,17].

Figure 6 Bhutan and neighbouring countries

4.1 The forestry sector[18]

The constitution of Bhutan mandates that 60 % of the country shall remain under forest cover. In line with this the National Forest Policy (2011) states its goal that "*Bhutan's forest resources and biodiversity are managed sustainably and equitably to produce a wide range of social, economic and environmental goods and services for*

[15] National Statistics Bureau. Statistical Yearbook of Bhutan 2012 (2012) Thimphu: NSB. 237.
[16] DoFPS. Forestry facts, figures & trends. (2011) Thimphu: Ministry of Agriculture and Forests.
[17] Ministry of Agriculture and Forests. Land cover atlas of Bhutan 1:250000 (2011) Thimphu: MoAF. 21.
[18] This section is largely based on Bhutan's Second National Communication to the UNFCCC in November 2011.

the optimal benefit of all citizens while still maintaining 60 % of the land under forest, thereby contributing to Gross National Happiness". Currently 70.46 % of the land or 27,052.91 km^2 is forested. The 2nd GHG Inventory estimates that 6309Gg of CO_2 was sequestered in 2000.

Bhutan has one of the highest proportions of area under protected areas in the world with five national parks, four wildlife sanctuaries, one strict nature reserve and biological corridors, altogether making up 51 % of the country's total area (NCD 2009).

The forest policy mandates that timber production is for domestic demand only and commercial logging is limited to forest management units (FMUs) and very small concession areas. Rural timber demand is met through a single tree selection system. There are a total of 18 FMUs in operation with scientific silvicultural management plans. The operational FMU collectively cover a total forest area of approximately 202601 ha, which is equivalent to 5.28 % of the total geographical area.

As a national programme, reforestation of degraded forest land and afforestation of barren lands was the earliest conservation initiative in Bhutan. As early as 1947, the first forest plantation was established, 11 years prior to the Department of Forests (now the Department of Forest and Park Services) coming into being. Since then, the reforestation and afforestation programme has been carried out on more than 21,500 ha. Reforestation and afforestation has been a regular feature in all the Five Year Plans and has been carried out at the rate of about 2,400 ha per Five Year Plan.

Since the re-initiation (after some delays in the kick-off) of a programme on community forestry from 2001, around 529 community forest units covering 59663.67 ha of forestland were established so far. These units aim to empower rural communities to manage forests sustainably for socio-economic and environmental benefits, poverty reduction and to contribute in overall sustainable forest management at the national level through strengthening rights, responsibilities and capacities of local communities[19].

[19] Royal Government of Bhutan MoA. National Forest Policy - draft--Royal Government of Bhutan MoA, ed. (2010a) Thimphu: Royal Government of Bhutan, Ministry of Agriculture. 19.

4.2 Forestry in the government

In Bhutan, the forestry sector is dealt with under the Ministry of Agriculture and Forests (MoAF), under the Department of Forest and Park Services (DoFPS). The Watershed Management Division under DoFPS is the national focal point for REDD+, and hence serves as the REDD+ Secretariat and coordinates the REDD+ Programme including the REDD+ Readiness activities. The Forest Resource Management Division (FRMD) under DoFPS leads the coordination, development and implementation of the NFMS AP. The structure of MoAF and DoFPS is presented in Figure 7 and Figure 8, respectively.

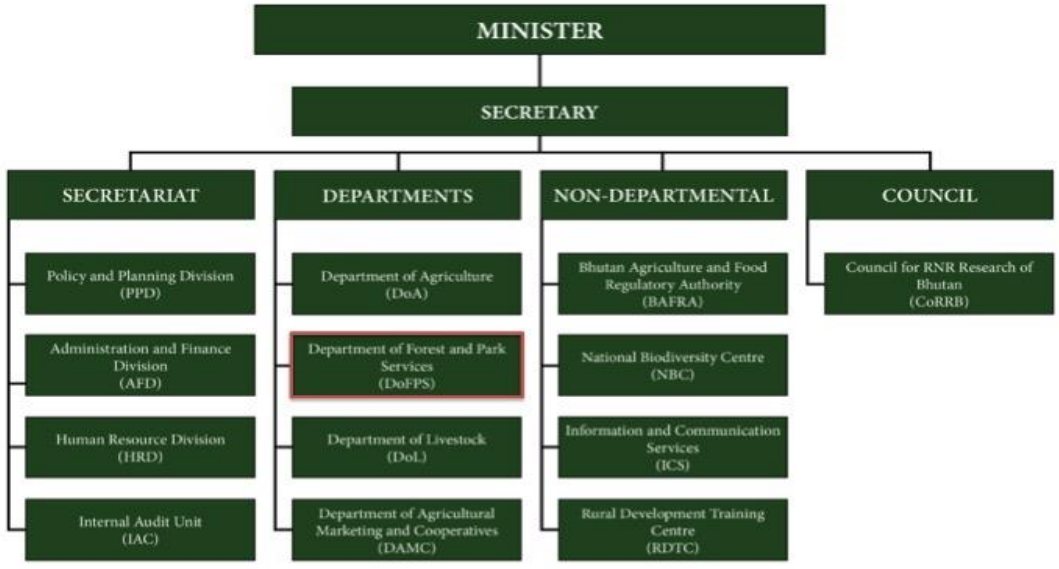


Figure 7 Organogram of the Ministry of Agriculture and Forests

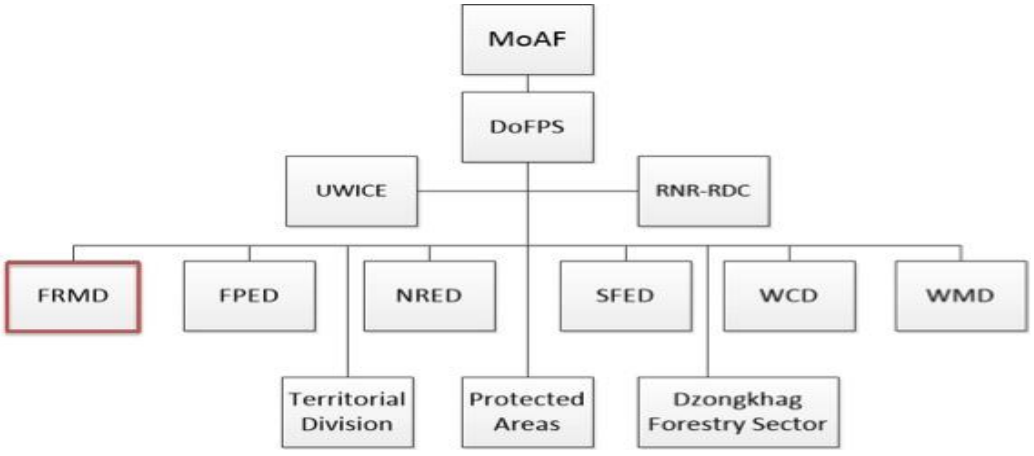


Figure 8 Organogram of the Department of Forest and Park Services, including the position of FRMD

5 CAPACITY ASSESSMENT

In order to ensure that the NFMS 1) builds on existing systems and capacities and 2) brings together all relevant stakeholders to avoid overlap in the development and implementation of technical systems, this section is designed to set out in detail the existing capacities in Bhutan for each of the component elements of the NFMS.

5.1 Land monitoring system satellite

5.1.1 Assessment of current status

5.1.1.1 Government

The MoAF pioneered the use of geospatial tools in Bhutan. It is involved in generating a series of Land Use and Land Cover (LULC) maps for the country. The first LULC map was produced in the early 1970s using aerial photographs and carrying out field surveys with support from Government of India. The second LULC map was generated in 1995 with support from DANIDA. Combination of SPOT satellite imageries and aerial photographs was utilized. Manual digitization was carried through visual interpretation. The latest LULC map was produced in 2010 making exclusive use of ALOS satellite imagery. This project was support by GEF. (Figure 9).

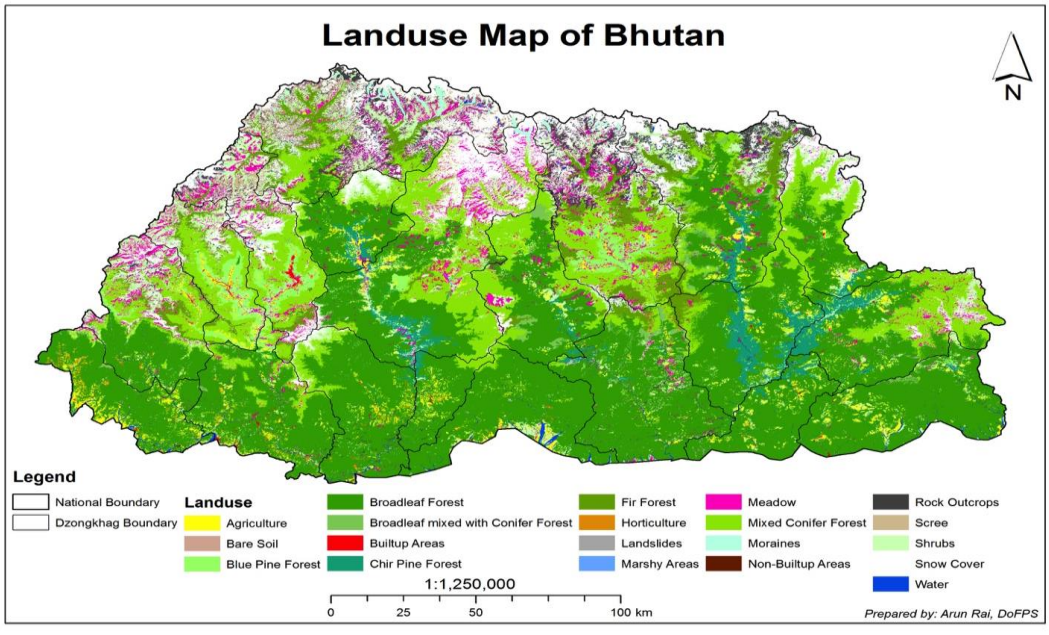


Figure 9 LULC map for Bhutan in 2010

The GIS Unit of the DoFPS is housed at FRMD. This unit caters for the technical assistance of GIS in the department. The unit is also mandated to maintain a forestry activities geo-database of the department. They also provide simple training on use of geospatial tools and generating geospatial data for simple analysis to field forestry personnel.

There are many government agencies using geospatial tools and generating geospatial data. The establishment of GIS units in most agencies was project oriented, ad-hoc in nature and mostly donor supported. Today there are more than 30 agencies involved in the use of geospatial tools, including three colleges with GIS courses. GIS courses in colleges cater for a basic introduction to the use of geospatial tools and their application is various fields. All these separate GIS units have been working independently driven by their respective project objectives and produced their own sets of geospatial data. However, it was later discovered that different agencies were using different coordinate systems and there was lack data standard coupled with data duplication.

To streamline the geospatial activities, standardise the data and data sharing, all the agencies came together to form a common platform to maintain a common geo-portal. This has led to the creation of the Centre for GIS Coordination (CGISC), where all the agencies using geospatial tools are represented by respective members (see website for more information as well as box 1 below). Still most of the geospatial work in government agencies remains project-oriented and often carried out by international experts.

Mandates of CGISC

1. The CGISC functions as the secretariat for National GIS Coordination Committee (NGCC)
2. Maintains the National repository of GIS data.
3. Provides and Mobilize technical backstopping to the GIS users and develops its capacity to do so.
4. Initiate and coordinate workshop, Seminars and Conferences to provide exposure to the GIS user community in Bhutan.
5. Promote dissemination of geospatial data.
6. Organize meetings of the NGCC and other working group on regular basis.

Member Agencies of CGISC

- National Land Commission (NLC)
- Gross National Happiness Commission (GNHC)
- Ministry of Work & Human Settlement
- Thimphu Thromde (TT)
- National Environment Commission (NEC)
- Department of information & Technology (DIT), MoIC
- Department of Hydropower & Power Systems (DHPS), MoEA

- Department of Hydro-Met Services (DHMS), MoEA
- Department of Geology and Mines (DGM), MoEA
- National Soil Service Centre (NSSC), MoAF
- Ministry of Education
- Royal Audit Authority (RAA)
- Election Commission of Bhutan (ECB)
- National Statistical Bureau (NSB)
- Bhutan Power Corporation (BPC)
- Bhutan Telecom Limited
- Department of Forest and Park Services (DoFPS), MoAF
- Department of Disaster Management (DDM), MoHCA
- College of Natural Resource (CNR), Lobesa
- Sherubtse College

Bhutan has also received support from FAO (as part of the BMU-ICI FAO-INPE REDD+ Project and the UN-REDD Programme) to work with a tool called 'Collect Earth' (http://www.openforis.org/tools/collect-earth.html). Collect Earth is a tool that enables data collection through Google Earth. In conjunction with Google Earth, Bing Maps and Google Earth Engine, users can analyze high and very high resolution Satellite for a wide variety of purposes. Collect Earth was customized at a grid of 2x2km grid based on our national configuration and NFI needs.

The main objective to use Collect Earth was to assess IPCC activity data for land use and land use change in forest (LULUCF or AFOLU) and REDD+ reporting; and to support National Forest Inventory (NFI) in carrying out the field enumeration work and generate preliminary information which would ease the field works and help in allocating resources in a more judicious and assertive manner.

A total of 9677 plots of 1 hectare area were analyzed laid across the country at a grid of 2 Km X 2 Km. These plots also include 2424 National Forest Inventory plots which are at the grid of 4Km X 4KM. The Open Foris Collect Earth was customized at 2 Km X 2 Km grids to generate more intensive and reliable data by visually interpreting the satellite images in Google Earth, Bing Maps and Earth Engine. The preliminary sets of data generated will also provide crucial information of NFI plots which will assist the NFI field crews while carrying out actual field works.

Bhutan has generated first set of preliminary data using this tool. However this needs further validation and cleansing which is under progress. The set of information generated has its limitation due to many factors. The data generated may not be very useful to assess land use changes due to inconsistency of images being analyzed.

The set of data generated were mostly using the Google Earth. Google. Earth Engine and Bing Maps could not be utilized efficiently due to poor connectivity. Cloud cover was the main draw back while using google earth and interpretation of Landsat was challenging for operators. Knowing the exact year of changes in landuse pattern was another difficulty due poor temporal resolution of google earth. Aforementioned factors has affected the quality of data generated.

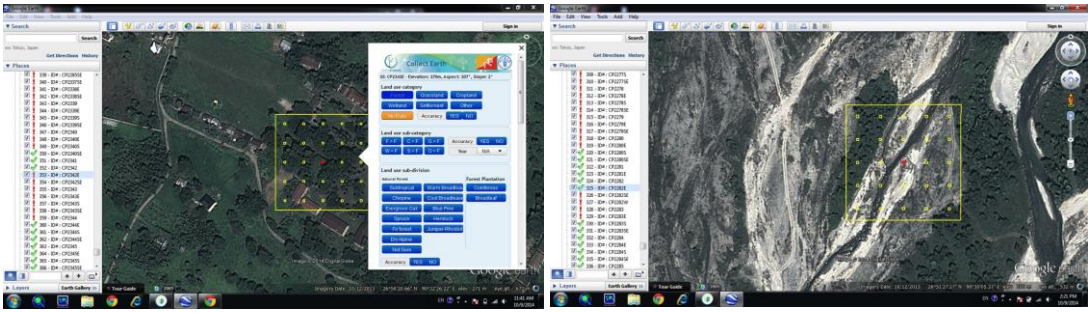


Figure 10 Examples of Collect Earth plots in Bhutan visualized in Google Earth

5.1.1.2 Non-Government

There is no non-government agency that exclusively deals with geospatial tools. WWF-Bhutan and the Royal Society for Protection of Nature (RSPN) are two non-governmental agencies that make use of geospatial data. These two agencies are mostly involved in using geospatial data for research purposes. Bhutan still lacks a competent geospatial private companies.

5.1.2 Assessment of areas for improvement

Despite the involvement of many agencies in the use of geospatial tools, the government has not identified any particular agency to carry out the LULC mapping of the country. To date, only the MoAF has been generating a series of LULC maps for the country. Most of the LULC products have been project-oriented (see Table 2 for a current list of projects and outputs). Within the MoAF, there is no permanent GIS / remote sensing office set up that is equipped with full time working technical staff. International experts have led all the LULC mapping in Bhutan, with little capacity building within the ministry. People involved in the various projects were mostly non-GIS personnel; they were just guided by the international experts to carry out particular tasks with no proper training and education.

All the software and hardware for carrying out geospatial analysis depends on the project objectives and duration. There is no standard set up by the government for using satellite data and methods for image analysis. Different data and

methodologies have been used to carry out an inconsistent series of national LULC maps.

Two officers manage the GIS unit of the DoFPS. This unit lacks image analysis software. There is a need to improve this unit with training of existing staff to enable them to integrate the geospatial tools for land use and land cover monitoring. The professional capacity of the existing staff needs to be updated and strengthened. The unit requires upgrading with hardware and software.

The Government should identify a single agency to be responsible for carrying out the LULC mapping of the country. The use of different types of satellite imagery to produce LULC maps should be standardised so that consistency can be maintained and change in land use and land cover can easily be understood and monitored.

Table 2 Projects and outputs concerning geospatial tools and analysis

Project	Outputs
Shapefiles (existing)	• Protected Area (National Parks and Biological Corridors) • Forest management Units • Community Forests • Leased forest area
Land use and Land Cover	• LUPP 1995 • LCMP 2010
Fire	• Burn Severity Mapping (1999-2009 by the United States Forest Service)
Canopy	• Canopy cover mapping (on-going)
NFI	• NFI plots
Data from other agencies	• The National Land Commission (NLC) is developing a National Geoportal for data sharing. Agencies that have geospatial data will submit the data to NLC to be uploaded in the geoportal. • For the NFMS, relevant data will be extracted directly from the geoportal.

5.2 National Forest Inventory

5.2.1 Assessment of current status

5.2.1.1 Government

Policies, administration and political support

The National Forest Inventory (NFI) is a very important exercise for Bhutan as it will provide the much needed baseline information on the state of forests in the country as well as an opportunity to monitor changes over time. The most important objective of the NFI is to generate information and data required for sustainable

forest management and thus serving as an important tool for the government, policy makers and forest managers in ensuring a 60 % forest cover for all times to come as mandated in the Constitution of Bhutan, 2008 (Article 5 – Environment - paragraph 3). The need for a NFI is strongly reflected in the National Forest Policy, 2011.

The forest carbon assessment is another important objective of the exercise that will enable the inclusion of the forest carbon stocks and stock changes component within the traditional forestry management system and eventually enable the assessment of forest carbon stocks and forest carbon stock changes resulting from the implementation of REDD+ activities.

The FRMD under DoFPS of MoAF has been mandated with the responsibility of carrying out a periodic NFI. Despite technical and financial constraints, the exercise was planned in the 10th Five Year Plan (2008-2013) basis and the Preparatory Phase of the NFI began in 2009.

The Preparatory Phase was aimed at building the technical capacity and infrastructure required for implementing the NFI. Financial resources for carrying out the exercise were also continuously sought from the Royal Government of Bhutan, development partners and donor agencies. The FRMD pulled together different funding sources and technical assistance to support different components of the Preparatory Phase of the NFI. After completing major activities of Preparatory Phase, the implementation Phase of the NFI was started in 2012, with data collection from the cluster plots (sample plots) falling in the Paro Dzongkhag. The FRMD has completed data collection in seven dzongkhags, namely, Paro, Haa, Thimphu, Punakha, Tsirang, Wangdue Phodrang and Gasa comprising of 880 cluster plots of the total 2,424 cluster plots falling across the country. The Implementation Phase of the NFI, which will involve data collection from the remaining sample plots and analysis of the NFI data to generate a report on the state of forests and forest carbon stocks is reflected in the 11th Five Year Plan (2013-2018) document.

The NFI has received strong support from the past and present government and is placed as a priority activity included in the Performance Agreement necessitating reporting of progress and status to the parliament.

Institutional and technical capacity

Much technical capacity of the DoFPS has been developed to carry out the NFI during the Preparatory Phase. The NFI exercise is guided by the NFI Core team which is comprised of members from the Renewable Natural Resources Research

Development Centre (RNR-RDC), the National Soil Service Centre (NSSC), the National Biodiversity Centre (NSSC), the National Environment Commission (NEC), and the Royal Society for the Protection of Nature (RSPN), besides the specialists and experts from the department. The Honourable Secretary of the MoAF chairs the NFI Core team. The NFI core team serves as an advisory team to the FRMD on the NFI and associated activities.

FRMD developed the first draft of the NFI sampling design with the technical assistance of SNV and inputs from a stakeholder consultation workshop held in January 2009. The initial design had 26,935 cluster plots. The design was revised and further refined in 2010, with the support of the USDA-Forest Service and experts from the Yale School of Forestry and Environmental Studies. The NFI Core team endorsed the revised design. The new sampling design is a systematic sampling grid of 4km by 4km resulting in 2,424 cluster plots spread across the country.

The NFI data collection protocol was also refined based on the experience of pilot exercises carried out in Toebisa gewog, in October 2009. The NFI data collection protocol, known as the Field Manual, was finalised and printed in 2012 with the support of the Bhutan Trust Fund for Environment Conservation (BTFEC).

The 'Implementation Modality', which describes the mobilisation of the NFI crew, training, their roles and responsibilities and their working relationship to FRMD, was developed and endorsed by the Ministry of Agriculture in 2011. Based on this modality, sixty forestry field personnel were identified and trained as the NFI crew. They are divided into twelve NFI crews comprising five members, of which one is identified as the Crew Leader.

The NFI crews have been given two rounds of carbon training, as strong emphasis is placed on quality of data being collected by NFI crew. The NFI crews have been trained in NFI data collection procedures, handling and care of equipment and reporting standards. This type of training was provided twice to all NFI Crew; one in Mongar in 2011, and another in Thimphu in 2012.

The field manual for 'aboveground understory forest carbon assessment' was developed (2009 – 2012) with the technical assistance of the USDA-Forest Service, the University of Washington and Yale University. It was printed by FRMD with the

financial support of BTFEC, the UNDP supported Low Emission Capacity Building Project and the EU-Renewable Natural Resources (RNR) Sector Support.

FRMD, in collaboration with RDR-RDC, is currently pursuing the development of biomass equation allometric models for 50 species in the country. Furthermore, a field manual has been developed and printed to apply the randomised branch sampling method to conduct destructive sampling to estimate the biomass of trees. Relevant officials within FRMD and RDC have been trained on this method.

FRMD is currently working with FAO to customise open source tools like Open FORIS and Calc (http://www.openforis.org) to develop a robust database management system for the NFI.

As the NFI was the first comprehensive nation-wide forest inventory for the country, several parallel activities to the actual NFI field exercise had to be initiated to develop reliable and comprehensive data. FRMD therefore initiated collaboration with two agencies under the MoAF to support FRMD with the forest carbon assessment. The RNR-RDC agreed to lead the biomass allometric equation development for fifty priority species and also support FRMD in getting oven-dried weights of the above ground forest carbon samples. The RNR-RDC also agreed to collaborate with FRMD on analysing the tree cores collected from the NFI plots. The Soil and Plant Analytical Laboratory (SPAL) of the National Soil Service Centre agreed to support FRMD in analysing the soil samples collected from the NFI sample plots for organic carbon content and soil nutrient content of the soil. As part of the collaboration, FRMD provided the two agencies with two drying ovens each, procured under the on-going FAO component of UN-REDD Targeted Support for 2014.

Equipment and Infrastructure

All the basic field equipment required for the NFI has been procured with the support of RGoB and BTFEC. However, there is need to procure additional equipment and field gear to replace dysfunctional, worn-out or lost equipment.

FRMD has set up a server room for the NFI database management system that will be made functional once the Open FORIS and Calc tools are harmonized to the NFI data parameters. Two workstations for the NFI database have been procured and are currently used as stand-alone devices to store the NFI data.

All twelve NFI crews are provided with a laptop each and required to transfer the data from the hand held data collector, Trimble Juno GPS. They are also equipped with a 500 GB external hard drive and a 8 GB pen drive to be used as back-up storage devices for the NFI raw data collected in the field.

Table 3 presents the timeline of the major activities of the NFI that have so far been undertaken.

5.2.1.2 Non-Government

The NFI Core team has a member from the RSPN, the only civil society organization in the country working on environment conservation issues. The NFI Core team is actively involved in the decision-making process for the technical aspects of the NFI.

5.2.2 Assessment of areas for improvement

While the technical capacity on NFI of the Department and the FRMD in particular has been built, there is need to develop the capacity in database management systems for the NFI so that it can develop a robust system that can be adapted and advanced in the future for periodic forest inventory (should the need arise).

Institutional capacity to enable periodic NFIs has to be improved. The FRMD continues its efforts to identify sources for continued funding to carry out the NFI, without which the NFI cannot be carried out.

Table 3 Timing of NFI activities undertaken and/or underway

Major activity	Start date	End date
Data User Consultation Workshop	21.01.2009	
Piloting of NFI in Toebisa geog	21.10.2009	21.11.2009
Formation of NFI Core Team (Office order to receipt of final nomination from stakeholder agency)	13.10.2009	08.12.2009
First Core team meeting: first presentation of plans and proposal for NFI	11.12.2009	11.12.2009
Introduction to Randomized Branch Sampling technique (Training)	18.12.2009	19.12.2009
Second Core team meeting, which decided upon utilizing forestry personnel of the department as the NFI crews	14.10.2010	
Procurement of field gears and equipment	16.03.2010	
NFI sampling design meeting with experts from USDA-FS and Yale University	29.02.2011	05.02.2011
Forest Carbon Assessment training by WWF	17.03.2011	18.03.2011
Procurement of field references	April, 2011	June, 2011
First NFI training in Mongar	06.06.2011	12.06.2011
Procurement of field gears	01.02.2012	

Endorsement of Field Implementation Modality vide Notesheet	02.04.2012	02.04.2012
Formation of NFI crews vide office order	04.04.2012	
Development of NFI field manual	30.12.2009	28.07.2012
Printing of NFI field manual	02.10.2012	19.11.2012
Second NFI training in Thimphu	16.04.2012	24.04.2012
Stakeholder consultation workshop for development of allometric equation	19.07.2011	
Training on Randomized branch sampling technique	19.07.2011	28.07.2011
Printing of RBS field manual	22.03.2012	25.04.2012
Visit of soil expert from USDA-FS and University of Washington	02.03.2012	11.03.2012
Launching of Implementation Phase of NFI-Inaugural Event	25.07.2012	
Launching of Implementation Phase of NFI-Field work in eight gewogs of Paro	27.07.2012	0.07.2012
Visit of soil experts and scientists from USDA-Forest Service	27.12.2013	09.02.2013
Field testing of forest carbon assessment protocol in Samtse and Phobjikha	30.01.2013	03.02.2013
Discussion on Forest carbon assessment protocol	04.02.2013	05.02.2013
Endorsement of Forest carbon assessment protocol by Core Team at the Fourth Core team meeting	06.02.2013	
Field work in Tsirang	15.03.2013	28.04.2013
Procurement of carbon equipment	April, 2013	
Establish server room for NFI	August, 2013	June, 2014
Field work in Haa	16.04.2013	13.06.2013
Field work in Paro	01.06.2013	04.07.2013
Field work in Thimphu	08.10.2013	20.11.2013
First forest carbon assessment training	02.10.2013	06.10.2013
Field work in Punakha	13.11.2013	24.12.2013
Field work in Wangdue (Phase I)	13.12.2013	06.02.2014
Field work in Wangdue (Phase II)	08.05.2014	27.06.2014
Second Forest carbon assessment training	06.10.2014	06.10.2014
Pre Assessment training and exercise	07.10.2014	09.10.2014

5.3 GHG Inventory and National Communications

5.3.1 Current status

The objective of a national GHG inventory is to estimate and report on anthropogenic emissions by sources and removals by sinks. Under the UNFCCC, information reported in GHG inventories[20] through National Communications

[20] The UNFCCC established the commitment for Parties to report national inventories of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol, to the extent its capacities permit, using comparable methodologies to be promoted and agreed upon by the Conference of the Parties.

provides the means by which the international community can monitor progress made by countries in meeting their commitments and mitigating climate change. A national inventory of anthropogenic GHG emissions and removals is typically divided into two parts:

a) Reporting tables (standardized data tables that contain mainly quantitative (numerical) information);
b) An inventory report (comprehensive and transparent information about the inventory, e.g. overview of trends, inventory compilation methodology and information on uncertainties).

The GHG inventory for the Forestry and Other Land Use (FOLU) sector (referring to the Agriculture, Forestry and Other Land Use, AFOLU, as part of the 2006 IPCC Guidelines for GHG Inventories) will be the key tool for reporting on the performance of the implementation of REDD+ activities, policies and measures to the UNFCCC in Phase 3 of REDD+.

The government is the key entity involved in the development and submission of the National Communication to the UNFCCC. Each country Party to the UNFCCC (including Bhutan) appoints a UNFCCC Focal Point within the government that is responsible for communications with the UNFCCC. The National Environment Commission Secretariat (NECS) is the focal agency for the UNFCCC.

NECS is the overall National GHG Coordinator and each sector will feed the required data to NECS for national and international reporting. Although FRMD is in the Ministry of Forestry and Agriculture, it will only feed information on FOLU to the NECS.

Bhutan's Initial National Communication was submitted in 13th November 2000; the Second National Communication was submitted in 28th November 2011. In these reports the GHG inventory was developed using 1996 IPCC guidelines for the preparation of national GHG inventories and Tier 1 default values. The Second National Communication[21] was published by the NECS financial support from the Global Environment Facility (GEF). The development and publication of the Second National Communication was coordinated by the NECS in collaboration with all the

[21] Bhutan's Second National Communication can be accessed here: http://unfccc.int/resource/docs/natc/snc_bhutan.pdf

relevant government ministries and agencies, and other organizations as well as the private sector *(List of agencies consulted may kindly be extracted from the Second National Communication, cf [21]).*

The project proposal development for the Third National Communication will commence in January 2015 and will be coordinated by the NECS. Outcomes from the NFI process and the initial Open Foris Collect Earth analysis will be very essential in the compilation of the FOLU data for the GHG inventory.

5.3.2 Assessment of areas for improvement

NECS being the focal agency for maintaining national GHG data and reporting, the sectoral GHG data will be fed by the concern sectors. FRMD under DoFPS being the focal division for compilation forestry GHG data and submitting to NECS, a thorough assessment on existing capacity and strengthening the existing capacity is a priority to ascertain quality GHG data of forestry sector.

Different LULC map of Bhutan was generated from different data sets with different methodology. There was inconsistence in generation of LULC map over the period of time. Two GHG inventory were also based on these data sets. There is a need to adopt and maintain consistency in generation of LULC map for Bhutan. The outcome of NFI and activity data generated from Collect Earth, which will be followed by wall to wall mapping will greatly enhance the credibility of sink capacity, thereby by national GHG inventories. NECS is also supporting the NFI through the Low Emission Capacity Building Project (LECB) project specifically for carbon data assessment.

It is also noticed that when different sectors submit the sectorial GHG data to NECS, there is inconsistency is data standard and data format. Creating awareness and imparting training to concern sectors on data standards while submitting the data to NECS is also a priority. Under the LECB project, a GHG data inventory data management system will be developed. The framework for the GHG inventory data management system has already been completed. Though the above-mentioned GHG inventory data management system, NECS is planning to make the data compilation more systematic in collaboration and / or consultation with all the relevant sectors.

6 IMPLEMENTATION OF THE NATIONAL FOREST MONITORING SYSTEM

6.1 The three phases of implementation

Bhutan will follow the phased approach proposed by the UNFCCC for the implementation of the REDD+ and the development of the NFMS (Figure 11).

Phase 1 includes the planning and preparation of tools for the NFMS. It includes the selection of technical systems, capacity building and technology transfer while defining policies, measures and institutional arrangements for the implementation of the NFMS.

In Phase 2, the country should start the implementation of REDD+ demonstration activities (potentially at the sub-national level), which should lead to measurable results. Monitoring of demonstration activities is required in Phase 2 to assess this performance. The monitoring function will also provide information on land use and land use changes in areas where demonstration activities are implemented and allow the SLMS to be tested and refined before full national implementation begins.

In Phase 3, the monitoring of REDD + activities will be extended to the whole country to assess whether national policies and measures are results-based.

Each phase aims to build capacity and prepare for the next phase, thus allowing a degree of overlap between the phases, especially in terms of capacity building.

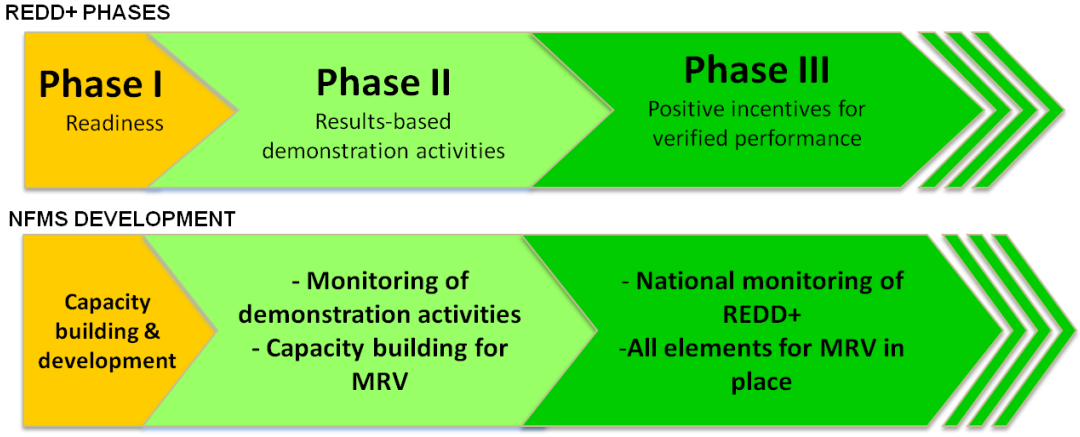


Figure 11. Phased implementation of the national forest monitoring system (NFMS: national forest monitoring system).

6.2 Outcome 1: Cross-cutting NFMS activities implemented

The first step of implementation is the identification of institutional arrangements for the development and implementation of the NFMS, requiring close consultation and coordination between all stakeholders at the national and subnational levels. The establishment of institutional arrangements, including clear definition of the roles and responsibilities of various identified stakeholders, is essential in the long term in order to establish a national system for sustainable monitoring and MRV.

Internationally accepted quality criteria are set out in the IPCC GPG and Uncertainty Management for National GHG Inventories (IPCC, 2000), the IPCC GPG for Land Use, Land-Use Change and Forestry (GPG-LULUCF) (IPCC, 2003), and the IPCC 2006 Guidelines for National Greenhouse Gas Inventories (IPCC, 2006). According to these guidelines, national GHG inventories must be:

- **Transparent**: There is sufficient and clear documentation to understand how the inventory was compiled and confirm the quality of the data;
- **Complete**: Estimates are reported for all relevant activities and gases (where data are missing, their absence should be clearly documented);
- **Consistent**: Estimates for different inventory years, gases and categories are made in such a way that differences in the results between years and activities reflect real differences in emissions;
- **Comparable**: The GHG inventory should be reported in a way that allows it to be compared with GHG inventories from other countries; and
- **Accurate**: The GHG inventory contains neither over- nor under-estimates, so far as can be judged, and uncertainties are reduced as much as possible (e.g. undertaking all efforts to remove bias from the inventory estimates).

6.2.1.1 Output 1.1: Institutional arrangements agreed and formalized

Activity 1: Set clear institutional arrangements for the implementation of the NFMS

The institutional arrangements set out in Figure 12 for implementation of Bhutan's NFMS were discussed and agreed upon by stakeholders at the consultation held in Thimphu on 9-10 July 2014 and 30 July 2014 and validated in January, 2015.

The objective of the institutional arrangements for Bhutan's NFMS are the following:

1. To monitor the health and state of Bhutan's forests for enabling long-term conservation and sustainable forest management, and uphold the Constitutional requirement of maintaining 60 % forest cover in perpetuity;
2. To generate accurate and holistic data on forest area and carbon stock changes in a transparent and consistent manner using globally accepted methodologies for national and international reporting.

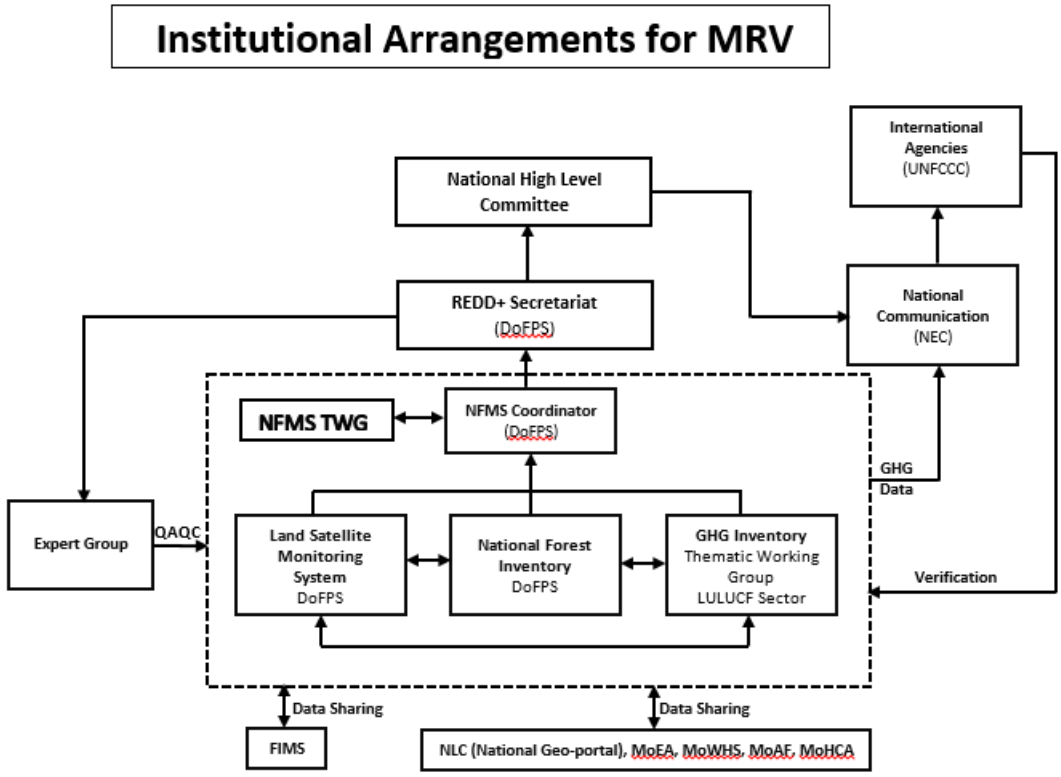


Figure 12 Institutional arrangements for the implementation of Bhutan's NFMS

The institutional structures / processes for the implementation of the following elements of the NFMS are still to be further refined, discussed and agreed upon, by the NFMS TWG:

- Institutional structure for the Satellite Land Monitoring System (SLMS)
- Institutional structure for the National Forest Inventory (NFI)
- Institutional structure for the GHG Inventory (GHG-I)
- Official process for collating LULUCF-related data and submitting the National Communication to the UNFCCC
- Institution(s) for quality assurance and quality control processes

- Institution(s) responsible for the internal (domestic) independent evaluation

The NFMS TWG will be responsible for completing tables such as the ones below[22]:

Designated National LULUCF GHG Inventory Preparation Agency / Organization	UNFCCC Focal Point (Name) and Focal Point Agency	Describe the arrangements or relationship between UNFCCC Focal Point and the LULUCF GHG Inventory Preparation Agency / Organization

Role	Name	Organization	Contact Information	Comments
Inventory Director/Coordinator				
LULUCF Sector Lead				
Archive (Data and document) Manager/Coordinator				
QA/QC Coordinator				
Uncertainty Analysis Coordinator				
Other, e.g. GHG Policy Specialist responsible for capacity building and IPCC efforts				

➢ Activity 2: Enact legally-binding institutional arrangements for the implementation and operation of the national forest monitoring system

Once the institutional arrangements for all the components for the implementation of the NFMS have been refined and agreed upon by stakeholders, the NFMS TWG will be responsible for facilitating the formalisation of the institutional arrangements (and responsibilities) through a Memorandum of Understanding.

6.2.1.1 Output 1.2 *Capacity building delivered to stakeholders*

Activity 3: Implement national awareness-raising workshops on REDD+ and national forest monitoring systems for REDD+

[22] Taken from: Hewson, J., Steininger, M. and Pesmajoglou, S., eds. 2013. REDD+ Measurement, Reporting and Verification (MRV) Manual. USAID-supported Forest Carbon, Markets and Communities Program. Washington, DC, USA

Awareness raising, training and lessons learned workshops should be delivered to national and subnational stakeholders (government and non-government) throughout the implementation of the NFMS. This will serve to refresh technical knowledge and update relevant actors on the status of implementation. The following sub-activities will be considered as part of this activity.

Sub-activity 3.1: Workshops to provide information on:

- Country party commitments to the UNFCCC;
- Details of the evolution and structure of REDD+;
- The principles of result-based positive incentives and the role of MRV;
- Parameters that can be assessed/addressed by the "monitoring" function;
- Definition of measurement needs and regular reporting of these elements;
- Existing options for MRV for REDD+ activities;
- Examples of NFMSs, forest monitoring methods and MRV from other countries.

Sub-activity 3.2: Review and assess the legal framework and major socio-economic activities in the country have a direct or indirect influence on REDD+ and the NFMS; and define nationally-appropriate elements to be included in the monitoring function of the NFMS. These nationally appropriate elements could include, e.g. monitoring systems for protected areas, logging / mining concessions and / or community forest areas.

Sub-activity 3.3: Based on the list of elements to be included in the monitoring function, assess how these indicators can be monitored, improved by legal or technical support, and how the tools for MRV may be used to ensure that the monitoring function is designed effectively.

6.3 MRV function

6.3.1 Outcome 2: Satellite Land Monitoring System developed and operationalized

The Satellite Land Monitoring System (SLMS) is the tool within the NFMS used to collect and assess activity data (AD) – data on land use and land use changes resulting from human activities. The IPCC indicates that countries should accurately and completely represent and report all land areas in a country where human activities take place (land use categories). This land representation should also reflect the historical trends in land-use area (20 years as a default value as

suggested by the IPCC 2003, 2006) and information be reported to ensure transparency and comparability of estimates.

The use of remote sensing data rather than field data to assess AD offers developing countries such as Bhutan a way to assess historical changes in land use (dating back 20 years using freely available remote sensing data). The use of remote sensing tools also reduces the quantity and cost of ground-based measurements (e.g. for validation) for the assessment of the AD.

During early implementation, the main results of the SLMS in terms of reporting requirements will be:

- A 'starting point' matrix for the SLMS that describes national land use for the year in which the SLMS is established;
- A 'basemap' matrix that describes changes between a base year and the 'starting point' matrix (i.e. historical analysis);
- An annual matrix of land use change;
- An annual conversion matrix that accounts for changes between land use sub-categories in detail.

The guiding principles, which will be adhered to where possible, for the development of the satellite land monitoring system will be:

- Compliance with UNFCCC reporting for consistent land use representation;
- Based on the successful proven operative SLMS and adapted to country's needs;
- Cost-effective for annual national coverage;

This section presents the activities that Bhutan will implement to develop its SLMS.

6.3.1.1 Outcome 2.1: SLMS office set up and strengthened

➢ **Activity 1: Strengthen SLMS unit by additional staff identified through job mapping**

Currently there are only two staffs working in GIS section of DoFPS to provide geospatial services to line agencies of the department. Additional staff will be required to efficiently run the SLMS unit in the department. Additional staff need to be have some basic remote sensing, GIS and IT knowledge.

Sub-activity 1.1: Map the existing human resource and additional requirement

Sub-activity 1.2: Finalize the working arrangement of additional staff and seek approval from the department

➢ Activity 2: Set up SLMS Unit in the DoFPS

GIS section of the DoFPS is currently housed at FRMD. This section is mandated to provide geospatial backstopping to the department. The section has been providing training on basic use of GIS for sustainable forest management and wildlife conservation to the field forestry personals. GIS section will be upgraded to SLMS unit.

Sub-activity 2.1: Determine additional office space and furniture requirement.

Sub-activity 2.2: Renovate or extend the office (if required) and procure required additional furniture.

Activity 3: Procure SLMS equipment (hardware and software)

Sub-activity 2.1: Map the existing hardware and software and identify the additional requirement.

Sub-activity 2.2: Call for quotation and procure the additional hardware and software

Sub-activity 2.3: Set up hardware and software in the SMLS laboratory.

6.3.1.1 Outcome 2.2: Land use change analysed

➢ Activity 4: Conduct consultation/sensitization workshop.

There are different types of satellite imageries available in the market ranging from freely available to the most expensive high resolution. Based on the national circumstances and meeting the international requirement, choice of appropriate satellite images for generating LULC map and forest monitoring at national level must be made. The choice of particular image for generating LULC map and forest monitoring should be explained relevant stakeholders and should be presented to policy makers.

Identifying the base year for measurement of carbon emission is a vital step for MRV. Based on the national circumstances, base year for the measurement must be

identified. SLMS staff guided with NFMS TWG must identify the base year and present to stakeholders and policy makers through workshop or technical meeting.

Sub-activity 4.1: Finalize the base year and time series for landuse change analysis

Sub-activity 4.2: Characterize the satellite imageries to be used for landuse change analysis

Sub-activity 4.3: Identify the drivers of deforestation and degradation

- **Activity 5: Train staff of SLMS unit on land use change analysis**

There are different software and methodology available for landuse change analysis. Its ranges from freely available to paid licensed version with its corresponding advantage and disadvantage. NFMS TWG will guide the delivery of appropriate training for technical staff, based on available funding. The SLMS technical staff, once appointed, will receive continued training on land use monitoring and assessment and monitoring system / web-portal management.

Sub-activity 5.1: Identify institutes, partners and support agencies for training the SLMS staff on historical landuse change analysis

Sub-activity 5.2: Train the technical staff on historical landuse change analysis.

- **Activity 6: Produce manual on geospatial technique on land use change analysis**

The SLMS technical staff, in collaboration with the NFMS TWG and other domestic and international support agencies and programmes, will develop a guidance and training manual document on the use of remote sensing and GIS to assess AD based on IPCC guidance and guidelines.

Sub-activity 6.1: Engage national/international professional expert for developing manual for geospatial technique on land use change analysis

Sub-activity 6.2: present manual to the NFMS TWG and seek endorsement from department.

- **Activity 7: Procure and process of satellite imageries**

Once the choice of satellite imageries and base year has been approved, SLMS staff should procure the satellite imageries and start processing the land use change analysis using identified methodology. There are two ways of producing LULC map and generating activity data; point sampling and wall to wall mapping. Bhutan will be using combination of aforementioned methods. Bhutan has already embarked upon testing the point sampling methodology using Collect Earth developed by FAO. Plot data collection (9,693 plots) has been already completed and is working on generating the LULC map. To evaluate its accuracy Bhutan will compare the LULC map generated from Collect Earth with its existing 2010 LULC map.

Following the training of SLMS staff will carry out wall-to-wall analysis for the purpose of monitoring the implementation of REDD+ Policies and Measures and their subsequent results, this step will involve the analysis of historical land use changes using satellite imagery.

Sub-activity 7.1: Procure or download satellite imageries with appropriate temporal and spatial resolution followed by geometrical and radiometric correction.

Sub-activity 7.2: Carry out historical land use change analysis

Sub-activity 7.3: Incorporate geospatial layers of drivers of deforestation and degradation

Sub-activity 7.4: Field validate generated LULC change map

Sub-activity 7.5: Generate land use change matrix

- **Activity 8: Document and produce technical report on land use change analysis**

Upon completion of wall to wall land use change analysis, SLMS working team need to produce a technical report. This report should detail out the data used, methodology, validation and generation of matrix for wider audience and future reference to maintain the consistency.

Sub-activity 8.1: Produce technical report on landuse change analysis.

Sub-activity 8.2: Present the report to the department and seek endorsement.

6.3.1.1 Outcome 2.3: SLMS web interface developed and launched

One way of making the national forest monitoring system transparent is through web portal. Bhutan will develop a SLMS web interface which will a part of REDD+

activity and enhance the transparency and credibility of its domestic forest monitoring system.

- **Activity 9: Hire national/international professional services for designing, developing and hosting SLMS database and geoportal**

  Sub-activity 9.1: Develop ToR for professional service required

  Sub-activity 9.2: Quote for the expression of interest of required professional services

  Sub-activity 9.3: Design and develop SLMS database and geo portal

- **Activity 10: Procure SLMS web server and peripherals**

  Sub-activity 10.1: Draw the specification of SLMS web server and peripherals

  Sub-activity 10.2: Float the quotation of specified SLMS web server and peripherals

  Sub-activity 10.3: Set up the SLMS web server and peripherals

- **Activity 11: Train SLMS unit staff on operation and maintenance of SLMS web interface**

  Sub-activity 11.1: Identify institutes, partners and support agencies for training the SLMS staff on operation and maintenance of SLMS data base and web interface

  Sub-activity 5.2: Train the technical staff on operation and maintenance of SLMS data base and web interface

- **Activity 12: Launch SLMS web interface**

  Sub-activity 12.1: Test the operation of SLMS database and web server

  Sub-activity 12.2: Conduct awareness workshop on SLMS web interface to the relevant stakeholders

  Sub-activity 12.3: Officially launch the SLMS web services

6.3.2 Outcome 3: Multipurpose NFI developed and implemented

The NFI is a key tool for measuring forest carbon stocks and changes – emission factors (EFs) – and thereby to estimate GHG emissions and removals

associated with forests. Implementing an NFI will involve ground-based measurements at strategically and statistically identified sites. Direct forest measurements will be used to estimate carbon stocks in different forest types. By assessing forest type-specific emission factors, NFI data will be used to greatly increase the precision of estimates of GHG emissions and removals.

IPCC Tier 3 reporting of EFs is the highest accuracy level and requires precise country-specific data. Bhutan will therefore develop allometric equations for tree species and/or forest types identified in the country.

6.3.2.1 NFI Institutional and Management Arrangements

FRMD of the DoFPS under MoAF is mandated to periodically carry out the NFI. The Implementation Modality endorsed by the ministry proposed to form four Inventory regions: the Eastern Region, the Western Region, the Central and the Southern region, comprising of the listed Territorial Divisions, Parks and Wildlife Sanctuaries (as depicted in Figure 13).

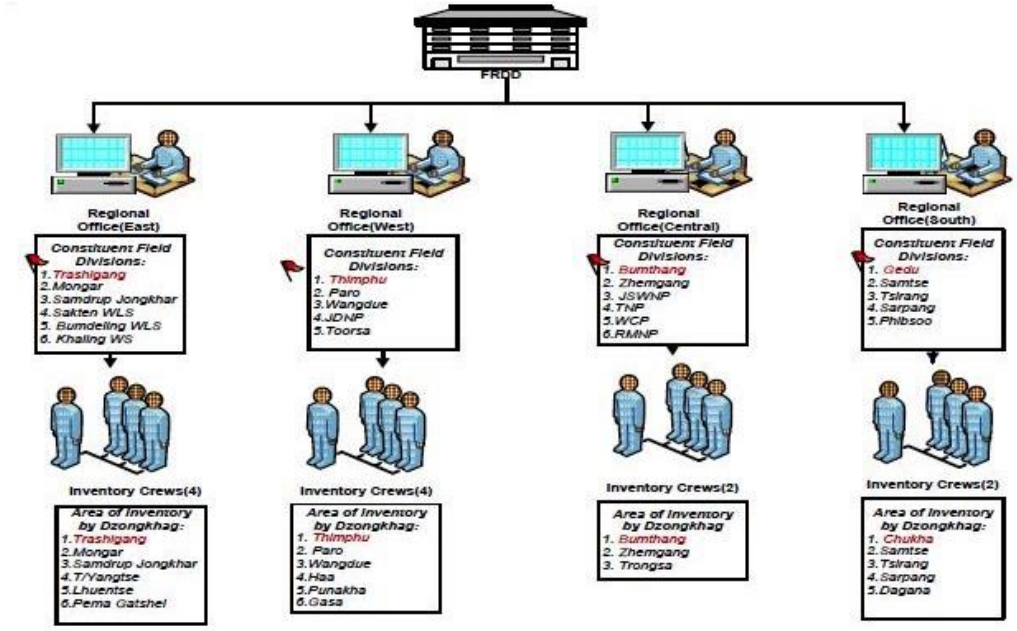


Figure 13 Implementation setup for the NFI

As per the modality, FRMD is responsible for coordinating and providing technical backstopping to the Regional Inventory Offices. In turn, the Regional Focal Offices are responsible for carrying out the inventory in their region and ensuring a timely

transfer of data to FRMD23. However, given the financial constraints and inability to source required funds, the regional offices could not be formed and considering the small size of the country, the NFI and Forest Carbon Assessment in future is recommended to be centrally coordinated. The Implementation Modality guided the NFI crew formation and the number of field personnel was drawn from the field offices based on their HR capacities. FRMD is using the Implementation Modality to build the institutional capacity of the department to carry out the periodic NFI and ensure the formation of regional offices, as reflected in the 11th Five Year Plan document.

6.3.2.1 Outcome 3.1: Infrastructure and Institutional developed

- **Activity 1: Develop a technical staffing proposal based on predictable funding and stable contracts**

Sub-activity 1.1: Form a team of technical experts to coordinate NFI

- **Activity 2: Train technical staff on the measurement of forest carbon stocks**

Sub-activity 2.1: Training on designing and implementing national forest inventories

Sub-activity 2.2: Training on IPCC Good Practice Guidance for the measurement of forest carbon stocks to relevant government and non-government personnel

Sub-activity 2.3: Training on descriptive statistics for NFI data analysis

Sub-activity 2.4: Training on GIS for NFI data analysis

Sub-activity 2.5: Training on the development of allometric equations for NFI data analysis

Sub-activity 2.6: Training on the processing, analysis and archiving forest inventory data (including the use of open source software

- **Activity 3: Build infrastructure for carrying out NFI and Forest Carbon Assessment stocks**

Sub-activity 3.1: Establish office infrastructures

[23] For detailed information please see the Implementation Modality: http://www.dofps.gov.bt/sites/default/files/Field%20Implementation%20Modality%20for%20NFI.pdf

Sub-activity 3.2: Build /equip laboratory facilities

6.3.2.2 Outcome 3.2: NFI methodology developed

- **Activity 4: Define the objectives and parameters of the multipurpose NFI**

Sub-activity 4.1: Stakeholder Consultation Workshop

- **Activity 5: Review existing NFI methodologies**

Sub-Activity 5.1: Evaluate existing NFI methodologies in the region

Sub-Activity 5.2: Estimate the cost of different NFI methodologies

Sub-Activity 5.3: Evaluate the capacity (necessary / available) to develop and implement an NFI

Sub-Activity 5.4: Make recommendations for the NFI methodology

- **Activity 6: Establish an official national definition of forest**

Sub-Activity 6.1: Review the literature and criteria for defining forest land

Sub-Activity 6.2: Review national legislation and existing forest definition(s)

Sub-Activity 6.3: Assess the adequacy of the national forest definition in the context of REDD+ (e.g. appropriateness for monitoring purposes)

Sub-Activity 6.4: Formulate a national forest definition appropriate for REDD+ with easily measurable criteria and indicators for monitoring of forest land
Sub-Activity 6.5: Implement a national validation workshop for the national forest definition

Sub-Activity 6.6: Legally adopt the national forest definition (if applicable, i.e. if there is a difference with the one already adopted in the National Forest Policy, 2011

- **Activity 7: Carry out needs assessment for the development of national EFs for the various categories of land use**

Sub-Activity 7.1: Carry out needs assessment for allometric equations to report EFs at Tier 3 in the national GHG inventory

Sub-Activity 7.2: Evaluate the possibility of obtaining the relevant equations from regional sources

Sub-Activity 7.3: Decide which IPCC tier will used to report on for different forest carbon pools

- Activity 8: Develop sampling design and methodology for multipurpose NFI
- Activity 9:Pilot NFI field work
- Activity 10: Analyse and verify NFI data from pilot exercise and estimate the variability within the forest strata
- Activity 11: Finalize and adopt the NFI methodology

Sub-Activity 11.1: Organize a national workshop to launch NFI

6.3.2.3 Outcome 3.3: NFI field manuals developedSatellite Land Monitoring System developed and operationalized

- Activity 12: Develop the NFI field manuals

Sub-activity 12.1: Develop field manual and SOPs for field data collection, biomass equation development and laboratory analysis

6.3.2.3 Outcome 3.4: NFI crew formed

- Activity 13: Form NFI Field crew

6.3.2.4 Outcome 3.5: Existing NFI data cebtralized

- Activity 14: Analyse regional data

Sub-activity 14.1: Review literatures

Sub-activity 14.2: Assess data availability within the country and regionally

Sub-activity 14.3: Assess potential economies of scale

- Activity 15: Identify and centralize all relevant data

Sub-activity 15.1: Identify all potential data partners and obtain data (eg. biomass equations, soil carbon data etc) from all relevant sources (government, NGOs, universities, etc.)

Sub-activity 15.2: Create a database for data centralization and incremental archiving of data

Sub-activity 15.3: Collect (and digitize, as appropriate) relevant data

Sub-activity 15.4: Carry out quality control and harmonization of data

6.3.2.5 Outcome 3.6: NFI fully implemented

- Activity 16: Carry out operational planning for field deployment

Sub-Activity 16.1: Determine the number and distribution (location) of field plots

Sub-Activity 16.2: Assess cost of implementation based on the number and distribution of sampling plots

- Activity 17: Carry out national-level training on the implementation of the methodology

- Activity 18: Field implementation (including any necessary activities to develop allometric equations)

Sub-Activity 18.1: Data enumeration from NFI sample plots

Sub-Activity 18.2: Data collection for allometric equation development

- Activity 19: Centralize and harmonize data field

6.3.2.6 Outcome 3.7: NFI crew formed

- Activity 20: Independently verify and analyse field data

6.3.2.7 Outcome 3.8: Forest carbon stocks data analysed and evaluated

- Activity 21: Input inventory data into specialized database

- Activity 22: Development of species –specific allometric equations and based on forest types

- Activity 23: Compile carbon stock data according to forest types

- Activity 24: Disseminate results

Results of the NFI data analysis will be distributed to all relevant stakeholders, as well as passed through formal communication lines to the NEC for input to the national GHG inventory (see next section).

6.3.2.8 Outcome 3.9: Periodic National Forest Inventory carried out and forest carbon assessed

To uphold the constitutional mandate of 60 percent forest cover for all times to come, periodic multipurpose national forest inventory should be carried out to be able to generate up-to date information and monitor the changes in forest over time.

6.3.3 Outcome 4: Bhutan's national GHG inventory for the Forest and Other Land Use (FOLU) sector is developed using national data

A GHG inventory is required to estimate and report emissions and removals of GHGs in a country to inform national climate change policies and processes and also for reporting to the UNFCCC. In Bhutan, NECS coordinates the National GHG inventory, as part of the periodic National Communications to UNFCCC that also contain information on national circumstances, mitigation actions, vulnerability and adaptation and other information. The latest report is the Second National Communication (SNC) submitted in 2011 contained the 2nd National GHG Inventory. The preparation of the Third National Communication (TNC) will begin in 2015 and is to be completed in 2018. In addition, Biennial Update Reports (BURs) focussing only on GHG inventory and mitigation information will be prepared every two years for submission to UNFCCC and the first BUR from Bhutan is to be submitted in 2016.

The 1st and 2nd GHG inventories from Bhutan were prepared using the 1996 GHG Inventory Guidelines of the IPCC. In the 1996 GHG inventory guidelines the forest component is included in the Land Use Change and Forest (LUCF) category. In the 2006 GHG inventory guidelines of the IPCC guide the forest component is part of the Agriculture, Forest and Other Land Use (AFOLU) sector. For the purpose of the NFMS and REDD+ activities, Bhutan will only cover Forests and Other Land Use (FOLU). The Agriculture component will need to be covered as part of the National GHG Inventory with consultation of the agriculture and livestock agencies.

The GHG inventory for FOLU category will be an integral part of the MRV system for the REDD+ activities in Bhutan. While the 1st and 2nd GHG inventories used a Tier 1 approach, subsequent GHG inventory for the FOLU category will be prepared at (at least) Tier 2 level of accuracy. However, selecting a Tier 2 approach requires significant investment in capacity building and data collection, which is currently inadequate.

This section presents the activities that Bhutan will implement to operationalize its REDD+-compatible national GHG inventory.

6.3.3.1 output 4.1: Capacity for FOLU GHG Inventory built

- Activity 1: In-depth technical training on IPCC methodology for Tier 2 GHG Inventory for FOLU

Targeted group like FRMD, RNR_RDC, NSSC and other relevant technical agencies are train on aforementioned methodology

- Activity 2: Awareness training on FOLU GHG Inventory for field level data generators

Field level forestry personals from territorial divisions, parks, dzongkhags and geog should be given awareness training focusing on FOLU GHG data generation.

- Activity 3: Awareness workshop for higher level managers

- Activity 4: Support strengthening existing laboratories and associated infrastructure

Currently RNR-RDC has the equipment for measuring the aboveground tree biomass and NSSC has the laboratory equipment for measuring carbon from soil and other pools. Existing laboratory equipment within these two offices need to be strengthen to increase the efficiency and credibility.

6.3.3.2 output 4.2: FOLU GHG Inventory and data management system institutionalized

- Activity 5: Identify and agree on roles and responsibility of various agencies for ensuring proper flow data flow and management for FOLU GHG Inventory

FRMD manages forest data collection and management through FIMS, NFI, and SLMS. GHG inventory estimates can be taken up within FRMD with support of relevant technical agencies and data providers. However, technical agencies (working on emission factors, allometric equation and other conversion factors) and data providers (feeding information into NFI, FIMS, and SLMS) Technical working group of NFMS can serve as a body to review and endorse the report and upon quality assurance would be shared with thematic working group. FOLU GHG inventory output could be submitted to NECS through National GHG Inventory Task Force.

6.3.3.3 output 4.3: Capacity for data management for FOLU GHG Inventory built

- Activity 6: Training for IT/data managers in FMRD

- Activity 7: Procure equipment and software

6.3.3.4 output 4.4: Periodic reports on FOLU GHG Inventory produced

- Activity 8: Publication and printing of periodic reports

Provide FOLU GHG inventory reports periodically for national review (60% forest cover, carbon neutral assessment) and for international reporting (REDD+ reporting, BUR and National Communications).

6.4 Outcome 5: Monitoring function of Bhutan's NFMS developed and implemented

In the context of REDD+, the objective of the monitoring function of an NFMS is to assess the performance of REDD+ activities (demonstration activities in Phase 2 and national policies and measures in Phase 3). While the MRV function focuses on the measurement of forestry-related GHG emissions and removals, the monitoring function goes beyond the assessment of forest carbon and focuses on other parameters such as forest health, biodiversity, forests conservation, provision of non-timber forest products, and social uses of forests. DoFPS maintains its monitoring database through Forest Information Management Section (FIMS). Non-spatial data related to forests from the field offices is submitted to FIMS on quarterly basis. These data includes, forest land leased, timber harvested, afforestation, reforestation and forestry area damaged by natural calamities.

Depending on method chosen by the country the monitoring function, including the SLMS, can become a key tool for wider national forest management and planning, beyond REDD+.

This section presents the activities that Bhutan will implement to develop the monitoring function of its NFMS. The implementation of these activities should be carried out by FRMD in collaboration with WMD, under the guidance of the NFMS, safeguard and REDD+ strategy option TWG.

6.4.1.1 Output 5.1: Monitoring function an awareness created and capacity built

- **Activity 1: Implement an awareness raising workshop on the monitoring function of the NFMS**

This planning activity will be key for the development and implementation of the monitoring function. It will include deliberation on what Bhutan wishes to monitor through the system, in order to get feedback on the effectiveness of the implementation of its selected REDD+ activities. It will also be critical to discuss and agree upon what the monitoring function can generate on the REDD+ safeguards, as part of the national system for providing information on safeguards. The NFMS

TWG and Safeguards TWG, where appropriate, will take the lead role in chairing these discussions and in bringing together diverse stakeholders, from local to national and government to non-government.

Beside, DoFPS, there are many other agencies who would be responsible for ensuring the smooth functioning of NFMS. Data on land lease, transmission lines, and farm road are very critical being the major drivers of deforestation in the country. Such geospatial data are maintained by other agencies and very crucial information for NFMS. Advocacy and awareness is key to getting stakeholders on board in order to ensure that a national monitoring function is agreed upon. This will be through a national workshop comprising of key stakeholders involved in forestry database and information management. At the end of the workshop, a workshop report will be produced that will inform other processes to define the scope and tools for monitoring function including its endorsement and needs for capacity development.

Sub-activity 1.1: Invite all stakeholders who would be responsible monitoring function

Sub-activity 1.2: Adopt/endorse a formal definition for the monitoring function

Sub-activity 1.3: Assess the roles and responsibilities of different stakeholders in the monitoring process.

Sub-activity 1.4: Draw agreement between DoFPS and relevant agencies on data sharing mechanism on drivers of deforestation and degradation.

➢ Activity 2: Synergize monitoring function and MRV for REDD+

Focus should geared towards strengthening the existing monitoring policies and tools. Database and web interface built for MRV should also suffice the need of monitoring function.

Sub-activity 2.1: Identify lead and collaborating agencies for monitoring and reporting

Sub-activity 2.2: Include monitoring aspect of strategy options and safeguard once they are finalized

- Activity 3: Train technical staff on the objectives of monitoring and the collection and processing of data

Sub-activity 3.1: Identify the technical staff from field and functional division in data collection and management for monitoring function

Sub-activity 3.2: Train the identified technical staff on collection and processing of data

6.4.1.1 Output 5.2: Criteria and indicators for monitoring are developed and measured

- Activity 4: Define criteria and indicators and develop tools to measure

Sub-activity 4.1: Define criteria and indicators for the monitoring of REDD+ activities (e.g. deforestation rate, timber volumes, network of protected areas, certified and non-certified forest concessions, reforestation areas, natural regeneration, etc.).

Sub-activity 4.2: Define/develop tools to measure/collect data on the identified criteria and indicators.

Sub-activity 4.3: Assess and determine the capacities available to monitor and generate data on the selected criteria and indicators.

Sub-activity 4.4: Assess the existing monitoring tools and harmonize integrated new tools

Sub-activity 4.5: Identify approaches to forest monitoring (remote sensing, field approaches, community-based approaches, etc.).

Sub-activity 4.6: Assess synergies between the tools used for the monitoring function and the MRV function of the NFMS.

6.4.1.1 Output 5.2: NFMS funding arrangement assessed and monitored

It is critical to carry out a detailed assessment of the funding needed to ensure the long-term sustainability of Bhutan's NFMS. All domestic and international sources of funding should be inventoried to assess which components of the NFMS are covered and where gaps exist. This funding analysis can serve as a domestic tool to

support requests for national government funding and as well as international support on specific work areas.

➢ Activity 5: Inventory of available funding

This activity will require the compilation of a table such as the one below, with all sources of funding identified:

NFMS Activity/ies	Source of funds	Amount secured (USD)	Financing period	Financing gap (USD)

As part of the funding inventory process, the following sub-activities will be considered separately, to ensure that domestic and international sources of funds are considered independently.

Sub-activity 5.1: Assess domestic financing needs and timeline.

Sub-activity 5.2: Assess the levels, sources and work areas of initial donor funding.

➢ Activity 6: Develop a timeline and mechanism of funding allocations and implementation

When all NFMS-related funding sources have been assessed, the MoAF will develop a multi-year timeline for the full implementation and management of the NFMS that includes all funding sources, with gaps clearly identified.

➢ Activity 7: Deliver a national validation workshop of NFMS funding allocations and the implementation process

To ensure transparency in all matters relating to NFMS, financing a half-day workshop will be delivered by the MoAF to present all funding sources and gaps to relevant stakeholders.

6.4.1.1Output 5.4: Demonstration activities (Phase 2 of REDD+ implementation) are defined and monitored

➢ Activity 8: Define demonstration activities

The REDD+ Secretariat will lead these consultations during which demonstration activities will be defined, in close collaboration with FRMD, the REDD+ task Force,

the three TWGs and other relevant REDD+ stakeholders in Bhutan. Besides gaining more concrete experience on the monitoring and implementation of REDD+ activities, the demonstration activities will also provide comprehensive information on other aspects of REDD+ including strategy options, safeguard information, benefit sharing and governance. It will be critical that demonstration activities can be effectively monitored in order to evaluate the outcome and success of REDD+ activities.

- Activity 9: Collect data
- Activity 10: Analyse and evaluate data

6.4.1.1 Output 5.5: National REDD+ policies and measures (Phase 3 of REDD+ implementation) monitored

- Activity 11: Collect data
- Activity 12: Analyse and evaluate data

7 RISK ASSESSMENT

WMD has undertaken a study on Corruption Risk Assessment for REDD+ in Bhutan with the support from the UN-REDD Programme (UNDP lead); the document is in its final draft form. The draft document will be discussed and endorsed by REDD TWG and other REDD+ stakeholders.

A risk assessment will be carried out to define the key risks that could restrict or impede the implementation of the NFMS. Following international standards on risk assessment, this includes an overview of the main risks and an assessment of mitigation/elimination measures. Regular consultations will be coordinated by the NFMS TWG during the implementation of the Action Plan to ensure the risks included are appropriate and comprehensive, in the context of Bhutan's national circumstances, and that appropriate mitigation measures are put in place.

7.1 Outcome 6: NFMS risk assessment completed and mitigation measures put in place

7.1.1.1 Output 6.1: Risks associated with implementation of NFMS are identified and defined

➢ Activity 1: Develop a list of relevant risks (NFMS TWG)

Sub-activity 1.1: Review reports of NFMS-related projects (in preparation, ongoing or completed) to compile a list of potential risks

Sub-activity 1.2: Identify the general risks that may affect the implementation of the NFMS, country-specific risks and the likely management structures

- Country risks, for example (non-exhaustive list):
  - ✓ Governance, recent history, government commitment to REDD+/NFMS and political will, etc.
  - ✓ Societal
  - ✓ Capacity of civil society
  - ✓ Fraud and corruption
  - ✓ Financial management
  - ✓ Law enforcement

- NFMS-specific risks, for example (non-exhaustive list):
  - Complexity and ambition of the project in relation to national capacity
  - Geographic coverage
  - Design and flexibility of project implementation and operationalization of the NFMS:
    - Clarity of definitions of what constitutes successful implementation of the NFMS
    - Clarity of design and definition of objectives
    - Clarity of steps
    - Clarity of responsibilities and accountability
    - Methodological clarity
  - Complexity of institutional arrangements

- Review of technical risks, for example (non-exhaustive list):
  - Availability of sufficient numbers of qualified staff
  - Proficiency of technical skills
  - Transparency of all financial transactions

7.1.1.1 Output 6.2: Risk mitigation measures are defined and implemented

- Activity 2: Define potential mitigation measures for each identified risk

- Activity 3: Consult with all relevant stakeholders to implement risk mitigation measures

8 WORK PLAN AND BUDGET

8.1 NFMS Implementation Work Plan

Outcome 1: Cross-cutting national forest monitoring system activities implemented

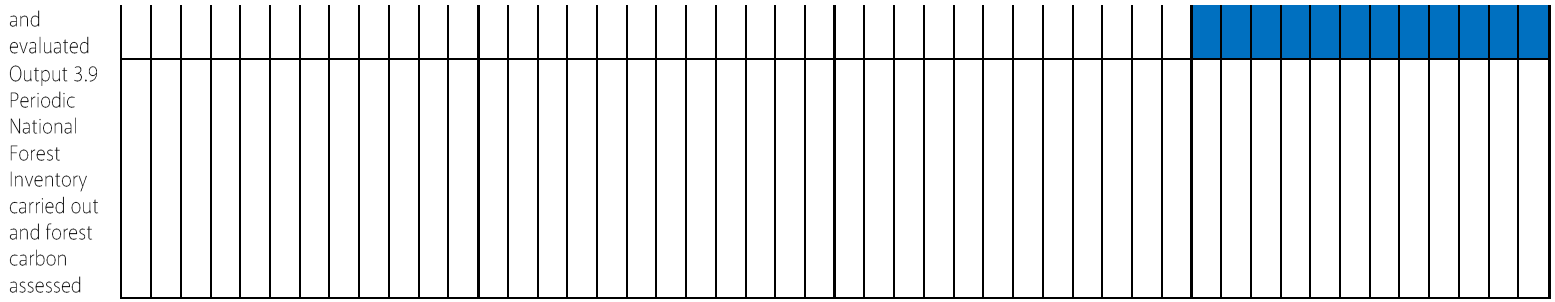
	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 1.1 Institutional arrangements agreed and formalized	■	■	■													
Output 1.2 Capacity building delivered to stakeholders				■	■	■					■	■	■			

Outcome 2: Satellite land monitoring system developed and operationalised

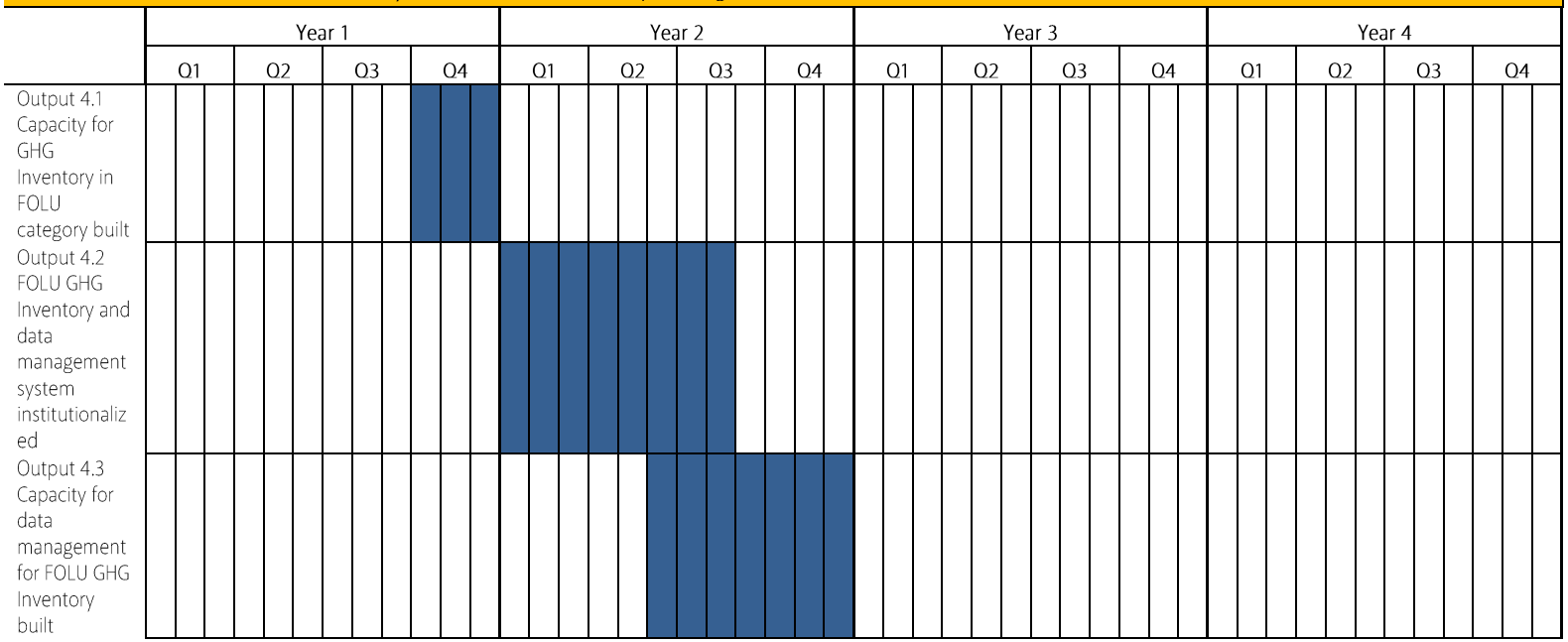
	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 2.1 SLMS office set up and strengthened	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Output 2.2 Land use change analyzed					■	■	■	■	■	■	■	■				
Output 2.3 SLMS web interface developed and launched													■	■	■	■

Outcome 3: Multipurpose national forest inventory developed and implemented

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 3.1 Infrastructure and Institutional developed																
Output 3.2 NFI methodology developed																
Output 3.3 NFI field manuals developed																
Output 3.4 NFI crew formed																
Output 3.5 Existing NFI data centralized																
Output 3.6 NFI fully implemented																
Output 3.7 Data quality monitored																
Output 3.8 Forest carbon stocks data analysed																



Outcome 4: Bhutan's national GHG inventory for the FOLU sector developed using national data



	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Outcome 5: Monitoring function of Bhutan's NFMS developed and implemented																
Output 5.1 Monitoring function awareness created and capacity built																
Output 5.2 Criteria and indicators for monitoring are developed and measured																
Output 5.3 NFMS funding arrangement assessed and monitored																
Output 5.4 Demonstration activities (Phase 2 of REDD+ implementation) are defined and monitored																
Output 4.4 Periodic reports on FOLU GHG Inventory produced																

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Outcome 6: NFMS risk assessment completed and mitigation measures put in place																
Output 6.1 Risk associated with implementation with NFMS are identified and defined																
Output 6.2 Risk mitigation measures are defined and implemented																
Output 5.5 National REDD+ policies and measures (Phase 3 of REDD+ implementation) monitored																

8.2 NFMS Implementation Budget

Outcome 1: Cross-cutting national forest monitoring system activities implemented	Year 1	Year 2	Year 3	Year 4	Total
Output 1.1 Institutional arrangements agreed and formalized Output 1.2 Capacity building delivered to stakeholders					
				Outcome 1 sub-total	0

Outcome 2: Satellite land monitoring system developed and operationlised	Year 1	Year 2	Year 3	Year 4	Total
Output 2.1 SLMS office set up and strengthened Output 2.2 Land use change analyzed Output 2.3 SLMS web interface developed and launched					
				Outcome 2 sub-total	0

Outcome 3: Multipurpose national forest inventory developed and implemented	Year 1	Year 2	Year 3	Year 4	Total
Output 3.1 Infrastructure and Institutional developed Output 3.2 NFI methodology developed Output 3.3 NFI field manuals developed Output 3.4 NFI crew formed Output 3.5 Existing NFI data centralized Output 3.7 Data quality monitored Output 3.8 Forest carbon stocks data analysed and evaluated Output 3.8 Periodic National Forest Inventory carried out and forest carbon assessed					
				Outcome 3 sub-total	0

Outcome 4: Bhutan's national GHG inventory for the FOLU sector developed using national data	Year 1	Year 2	Year 3	Year 4	Total
Output 4.1 Capacity for GHG Inventory in FOLU category built Output 4.2 FOLU GHG Inventory and data management system institutionalized Output 4.3 Capacity for data management for FOLU GHG Inventory built Output 4.4 Periodic reports on FOLU GHG Inventory produced					
				Outcome 4 sub-total	0
Outcome 5: Monitoring function of Bhutan's NFMS developed and implemented	Year 1	Year 2	Year 3	Year 4	Total
Output 5.1 Monitoring function awareness created and capacity built Output 5.2 Criteria and indicators for monitoring are developed and measured Output 5.3 NFMS funding arrangement assessed and monitored Output 5.4 Demonstration activities (Phase 2 of REDD+ implementation) are defined and monitored Output 5.5 National REDD+ policies and measures (Phase 3 of REDD+ implementation) monitored					
				Outcome 5 sub-total	0
Outcome 6: NFMS risk assessment completed and mitigation measures put in place	Year 1	Year 2	Year 3	Year 4	Total
Output 6.1 Risk associated with implementation with NFMS are identified and defined Output 6.2 Risk mitigation measures are defined and implemented					
				Outcome 6 sub-total	0
				Sub-total all outcomes	0
				Administrative costs and overheads (7%)	-
				Grand total	-

9 ANNEXES

9.1 Annex 1 Request of Bhutan to UN-REDD Programme Secretariat for Targeted Support

ROYAL GOVERNMENT OF BHUTAN
Ministry of Agriculture and Forests
Department of Forests and Park Services
WATERSHED MANAGEMENT DIVISION

WMD/53 /2012/ 547 Date 27/02/2012

Dear Thais Linhares,

With reference to your letter of 19th December, 2011, Bhutan would like to take advantage of the opportunity to secure funding from the one year budget for the "Support to National REDD+ Action – Global Programme". After discussion with in-country and regional representatives from the participating UN Agencies, we would like to request the following funding support:

Work Area	Amount (USD)	Explanation
(i) MRV and Monitoring:	40,000	Contribution to formulation of national REDD+ strategy, to incorporate actions to establish an effective MRV system
(ii) National REDD+ Governance	20,000	Contribution to formulation of national REDD+ strategy, to incorporate actions to mitigate against risk of corruption
(iii) National systems for transparent, equitable, credible and accountable management of REDD+ funding	20,000	Contribution to formulation of national REDD+ strategy, to incorporate actions to ensure a fair, transparent, and efficient REDD+ compliant BDS
(iv) Engagement of Indigenous Peoples, Local Communities and Other Relevant Stakeholders	0	
(v) Ensuring Multiple Benefits of Forests and REDD+	25,000	Contribution to formulation of national REDD+ strategy, to incorporate measures to ensure capture of multiple benefits
(vi) REDD+ as a catalyst for transformations to a green economy	0	

Please note that the amount requested above will serve as co-financing to funding support that we will receive from the UNDP Country Office and from the UNDP/UNEP "Poverty-Environment Initiative. We are confident that a combination of these three sources of funding will allow us to make substantive progress on formulating an effective national REDD+ strategy for Bhutan.

Yours Sincerely,

Tshering Gyeltshen
(Chief)
Watershed Management Division
Department of Forest and Park Services

WATERSHED MANAGEMENT DIVISION ★ Date..... ★ DEPARTMENT OF FORESTS

CC,

1. Mr. Tashi Samdrup, Focal Officer for REDD+, Ministry of Agriculture and Forests for follow up action please

P.O. BOX # 130, Thimphu Tel No. 975-2-323568/323539 Fax No. 975-2-321462

9.2 Annex 2 List of participants for July 2014 workshop

Sl. No	Name	Organization
1	Kinley Tshering	FRMD
2	K.B Samal	WMD
3	Dr. D.B Dhital	FRMD
4	Dr. P.B Chhetri	RNR-RDC Yusipang
5	Dr. Pema Wangda	WMD
6	Ngawang Gyeltshen	NRED
7	Sonam Peldon	WMD
8	Tshering Gyeltshen	WMD
9	Samten Wangchuk	WMD
10	Arun Rai	FRMD
11	Younten phuntshok	FRMD
12	Santosh Katwal	FRMD
13	Tenzin Choigey	UWICE
14	Tashi Choeden	MoEA
15	Kezang yangden	FRMD
16	Boby Pradhan	NLC
17	Jigme Tenzin	WMD
18	Phuntsho	FRMD
19	Joel Scriven	FAO / UN-REDD Programme
20	Danae Maniatis	FAO / UN-REDD Programme
21	Lindsay Cumming	FRMD
22	Sonam Peldon	SFED
23	Sigyel Delma	WMD
24	Jamyang Phuntshok	WMD

9.3 Annex 3 Terms of reference for the National REDD+ Task Force and Technical Working Groups

9.3.1 Terms of reference of National REDD+ Task Force

Purpose

The purpose of the REDD+ Taskforce is to serve as an official national forum for discussion and coordination of matters related to REDD+ programs in Bhutan and to decide and recommend actions for consideration by MoAF.

Members

1. Director General, DoFPS: Chair Person
2. Watershed Management Division, DoFPS: Member Secretary
3. Gross National Happiness Commission: Member
4. Department of Local Governance, Ministry of Home & Cultural Affairs: Member
5. Policy and Planning Division, Ministry of Agriculture and Forests: Member
6. Royal Society for Protection of Nature: Member
7. Tarayana Foundation: Member
8. Department of Public Accounts, Ministry of Finance: Member
9. National Commission for Women and Children: Member
10. Co-opt members as and when required (Team Leader of TWG and representative from other relevant agencies)

Roles and Responsibilities

The overall roles and responsibilities of the REDD+ Taskforce is to provide recommendation on REDD+ programs to the Ministry through the Chair Person of Task Force, while also carrying out the following:

1. Inform NCCC through REDD+ Taskforce Chairperson
2. To oversee the work of the three TWGs including M&E
3. Provide policy support
4. Review and approve annual work plan for REDD+ readiness activities
5. Ensure that REDD+ activities are aligned to National plans and policies
6. The REDD+ Taskforce will make recommendations to DoFPS and/or MoAF to ensure smooth implementation of REDD+ activities, policies and programs in Bhutan.

9.3.2 General terms of reference for all the three TWGs

Objective

The objective of Technical Working Group is to provide input for implementing the REDD+ Readiness activities. In general, the responsibilities of TWGs are as follows:

- Attend meetings organized by WMD and Team leaders as appropriate;
- Review, assess and draw lessons from existing international and/or national approaches for developing and implementing strategy options, safeguard, forest monitoring and reference emission/reference level in Bhutan;
- Review documents developed during readiness implementation and presentations and provide comments and inputs;
- Review Terms of Reference for the studies, inception reports submitted by the consultants and guidance to them on how best to carry out the studies;
- Provide technical input to consultants, REDD+ Secretariat and the REDD+ Taskforce to carry out their assignments;
- Support the development of Bhutan's national REDD+ strategy document;
- Attending training events and workshops.

Operation

The TWG will meet as and when required. WMD being the REDD+ Secretariat will coordinate the TWG meetings and therefore will be represented in each TWG. WMD will ensure that a notification of each meeting is sent out at least one week ahead of the meeting, accompanied by any relevant documents to be discussed at the meeting. WMD will ensure that there is proper linkage and coordination between the Task Force and TWGs and also among the TWGs. As and when required, WMD will notify members of all three TWGs or relevant TWG and coordinate with team leaders in organizing the meetings. However, if necessary, the members can meet among themselves without a notification from WMD. In such cases, the team leader would coordinate the meeting, with logistic support from WMD.

All members must designate alternates to attend if they are not available. Additional representatives may be invited to meetings as temporary participants / special invitee, if required. A representative from WMD will participate in all the TWG meetings.

WMD will circulate draft minutes of each meeting within three working days. All members of the TWG (or their alternates, if they attended the meeting) will provide comments on the draft minutes within three further working days, after which WMD will circulate the final minutes.

Terms of Reference for the REDD+ TWG on National Forest Monitoring System and Forest Reference (Emission) Levels (NFMS-RELs / RLs)

Background

A future mechanism for Reduced Emissions from Deforestation and Degradation in developing countries (REDD+) being developed through the United Nations

Framework Convention on Climate Change (UNFCCC) provides an opportunity to support Bhutan's efforts to reduce levels of deforestation and help to maintain and protect natural forests. In 2012 the RGoB initiated a REDD+ Readiness planning process, which in 2013 led to the development of Bhutan's REDD+ Readiness Preparation Proposal (R-PP) for the World Bank's Forest Carbon Partnership Facility (FCPF), a document outlining how the country will prepare to implement REDD+ activities, known as 'REDD+ Readiness'.

Decisions under the UNFCCC set out that developing countries aiming to undertake REDD+ activities should develop a number of technical elements. This working group will address two of these elements and assess what their implementation means in the context of Bhutan. The first is a national forest monitoring system (NFMS). Once developed, the NFMS will serve two functions:

- Monitoring of REDD+ activities: this function serves to assess whether REDD+ activities are resulting in positive outcomes. A key tool for this function is satellite remote sensing and analysis.
- Measurement, Reporting and Verification (MRV) of greenhouse gas (GHG) emissions: this function will assess whether REDD+ activities are resulting in reductions in forestry emissions and enhancements of forest carbon stocks. Key tools for this function are satellite remote sensing, a national forest inventory and a national GHG inventory.

The second element is the forest reference emission levels and forest reference levels (RELs/RLs). RELs/RLs are the benchmarks that the performance of REDD+ activities in reducing GHG emissions will be measured against. RELs/RLs will be central to determining the levels of positive incentives countries will receive for implementing REDD+ activities. Key components for developing RELs/RLs are satellite remote sensing and assessments of national circumstances. UNFCCC guidance on RELs/RLs is not complete, and Bhutan will need to determine how best to approach RELs/RLs, based on its national circumstances.

Objectives

The objectives of the Technical Working Group are to 1) to support the assessment and development of approaches to NFMS development and implementation, 2) ensure that lessons and experiences from current forest monitoring systems in Bhutan are incorporated into the NFMS design; and that lessons from similar analyses in other countries are integrated into recommendations for Bhutan's system, and 3) assess and support the establishment of a system to develop and implement RELs/RLs in Bhutan.

Members

1. Forest Resource Management Division: Team Leader
2. Ugyen Wangchuk Institute for Conservation and Environment: Member

3. National Land Commission: Member
4. National Environment Commission: Member
5. Ministry of Economic Affairs: Member
6. Ministry of Works and Human Settlement: Member

Responsibilities

The TWG is responsible for supporting the development of proposals for 1) Bhutan's NFMS (including subnational approaches, as necessary, as an interim measure), including institutional arrangements; 2) approaches to developing RELs/RLs in Bhutan (with subnational RELs/RLs being considered, as necessary, as an interim measure). Technical work areas will include (but not limited to);

- Developing National Forest Monitoring System-Action Plan
- Develop proposals for elements of a national approach for the development and implementation of Bhutan's NFMS and RELs/RLs;
- Design a consultative process for establishing consensus on Bhutan's NFMS and RELs/RLs;
- Discuss and propose approaches to integrated community forest monitoring into Bhutan's NFMS;
- Review proposals for REDD+ NFMS and RELs/RLs in other countries.

9.3.3 Terms of reference for the REDD+ TWG on Safeguards, Governance & Benefit Distribution

Background

The future mechanism of REDD+ in developing countries, being developed through the UNFCCC, provides an opportunity to support Bhutan's efforts to reduce levels of deforestation and help to maintain and protect natural forests. In 2012 RGoB initiated a REDD+ Readiness planning process, which in 2013 led to the development of Bhutan's REDD+ Readiness Preparation Proposal (R-PP) for the World Bank's Forest Carbon Partnership Facility (FCPF), a document outlining how the country will prepare to implement REDD+ activities, known as 'REDD+ Readiness'.

A number of REDD+ safeguards are listed in the Cancun Agreements, which are designed to ensure that the implementation of REDD+ activities does not result in negative social or environmental impacts. Safeguards can be broadly understood as measures that aim to address both direct and indirect impacts on communities and ecosystems by identifying, analyzing, and ultimately working to manage risks and opportunities. If designed and implemented appropriately, safeguards can help REDD+ provide a suite of multiple benefits. All countries aiming to implement REDD+ activities must develop nationally appropriate systems to provide information on how the REDD+ safeguards are being addressed and respected through the implementation of REDD+ activities, which will require extensive consultation and assessment of options.

The successful implementation of REDD+ activities will lead to the accrual of positive incentives from the international community. All countries implementing REDD+ will require a system to distribute these benefits in a manner that is equitable, transparent and cost-efficient. Such a system needs to take account of examples of benefit distribution currently or previously applied in Bhutan, as well as factors and issues that are specific to REDD+.

Objectives

The objectives of the TWG are to 1) to support the assessment and development of approaches to safeguards as part of Bhutan's REDD+ Readiness process, and 2) ensure that lessons and experiences from current or previous benefit distribution systems in Bhutan are assessed in the context of REDD+ requirements; and that lessons from similar analyses in other countries are integrated into recommendations for a REDD+ distribution system in Bhutan.

Members

1. Nature Recreation and Eco-tourism Division: Team Leader
2. Watershed Management Division: Member
3. Council for RNR research of Bhutan: Member
4. Bhutan Trust Fund for Environmental Conservation: Member
5. Royal Society for Protection of Nature: Member
6. Social Forestry and Extension Division: Member
7. College of Natural Resources: Member (Special invitee)
8. Ministry of Finance representative (special invitee)
9. Chairman from REDD+ local level committee or local institutions (special invitee)

Responsibilities

The TWG is responsible for supporting the development of proposals for 1) REDD+ safeguards (including indicators) and systems for providing information on the safeguards; and 2) a REDD+ BDS for Bhutan. Technical work areas will include (but not be limited to):

- Develop proposals for elements of a national approach to the implementation of REDD+ safeguards;
- Design a consultative process for drafting safeguards and safeguards information systems that ensure effective broad-based stakeholder participation;
- Review proposals for REDD+ benefit distribution systems in other countries;
- Develop preliminary proposals for benefit distribution through broad-based consultations.

9.3.4 Terms of reference for REDD+ TWG on REDD+ Strategy Options

Background

The future mechanism REDD+ being developed through the UNFCCC provides an opportunity to support Bhutan's efforts to reduce levels of deforestation and help

to maintain and protect natural forests. In 2012 the RGoB initiated a REDD+ Readiness planning process, which in 2013 led to the development of Bhutan's REDD+ Readiness Preparation Proposal (R-PP) for the World Bank's Forest Carbon Partnership Facility (FCPF), a document outlining how the country will prepare to implement REDD+ activities, known as 'REDD+ Readiness'.

A central aspect of the REDD+ Readiness process will be the determination of 1) which REDD+ activities will be implemented and 2) how the selected REDD+ activity/ies will be implemented in Bhutan. The outcomes of these decisions will comprise Bhutan's REDD+ Strategy Options. Making these key decisions about REDD+ implementation in Bhutan will necessitate thorough assessment of the costs, risks and benefits of each option; as well as wide consultation with all relevant stakeholders.

Objectives

The objectives of the TWG are to lead discussions and generate proposals for strategy options to implement REDD+ activities in Bhutan through a consultative process, including for the design of demonstration activities, for subsequent review by the Taskforce.

Members

1. Social Forestry and Extension Division: Team Leader
2. Wildlife Conservation Division: Member
3. National Soil Service Centre, Department of Agriculture: Member
4. RNR-Research Development Centre Yusipang: Member
5. Forest Protection and Enforcement Division: Member
6. Department of Livestock: Member
7. Natural Resources Development Corporation Ltd.: Member

Responsibilities

The TWG is responsible for supporting the development of proposals for strategy options to implement REDD+ activities in Bhutan. Technical work areas will include (but not be limited to):

- Discuss and propose the selection of the REDD+ activities to be implemented in Bhutan;
- Define a consultative process for designing and implementing REDD+ strategies, including supporting the organization of consultation workshops and seminars;
- Develop proposals for strategies and concrete actions to implement REDD+ activities in Bhutan, including demonstration activities at the national and/or sub-national level, and means to learn and apply lessons from demonstration activities;
- Carrying out or commissioning an analysis of the climate change mitigation impacts of different strategy options.

9.4 Annex 4 Awareness workshops carried out on REDD+ between 2010 and 2012 at national level

Workshops	Target Audience	Date	Number of Participants	Objectives of the workshop
Awareness Raising Seminar on REDD+	National Stakeholders involved in natural resources management	June 2010	70	• Familiarize with the basic concepts & different forms of REDD+ in international perspectives and negotiations • Sensitize key issues on various aspects • Inform policy makers of socio-economic and equitable sharing of benefits
National Workshop on REDD+ Strategy Development in Bhutan http://www.moaf.gov.bt/moaf/?p=7895	Multi-sector REDD+ stakeholders	April 2012	68	• To bring all stakeholders together and provide opportunity for the participants to familiarize themselves with the concept of the REDD+ mechanism and educate them on the process of REDD+ strategy development; • To institutionalize the REDD+ advisory committee and TWGs and finalize their mandates; • To share and identify the processes for the development of a National REDD+ Strategy
REDD+ Environmental Safeguard and Multiple Benefits workshop	National REDD+ stakeholders and probable implementers	October 2012	45	Build national awareness of, and capacity on REDD+ safeguards and multiple benefits

http://www.dofps.gov.bt/node/507	(District Officers)			
National Forest Monitoring System Workshop	National REDD+ stakeholders, technical NFI, remote sensing/GIS and GHG inventory staff	December 2012	40	• To enhance knowledge among Bhutanese REDD+ stakeholders on: 1) REDD+ activities and the negotiation process under the UNFCCC; 2) UNFCCC guidance on national forest monitoring systems for REDD+; 3) IPCC Guidance and Guidelines • Determine next steps for capacity building activities and support to the implementation of forest monitoring and measurement systems

9.5 Annex 5 REDD+ awareness raising at Dzongkhag level

Sl. No	District	Month date	No. of participants	Region
1	Chhukha	29th April 2013	122	South
2	Dagana	6th May 2013	108	
3	Gasa	18 Jan 2013	20	North
4	Haa	7th Jan 2013	30	West
5	Paro	8th Jan 2013	43	
6	Punakha	16th Jan 2013	35	
7	Thimphu	27th Feb 2013	65	
8	Trashigang	13th May 2013	105	East
9	Mongar	17th May 2013	100	
10	Trashi Yangtse	15th May 2013	50	
11	Trongsa	29th May 2012	45	Central
12	Tsirang	8th May 2013	138	
13	Wangdue	21 May 2013	45	

9.6 Annex 6 R-PP development team consisting of REDD+ TWG members and other relevant officials (April 2013-December 2013)

	Name	Organization
1	Mr. Chencho Norbu, Director General	Department of Forests & Park Services
2	Dr. Pema Wangda, Chief Forest Officer	Department of Forests & Park Services
3	Mr. Jigme Tenzin, Forestry Officer, (REDD+ Focal Officer)	Department of Forests & Park Services
4	Mrs. Sigyel Delma, Senior Forestry Officer	Department of Forests & Park Services
5	Dr. Sangay Wangchuk, Nature Conservation Specialist	Department of Forests & Park Services
6	Dr. D.B. Dhital, Forest Resource Management Specialist	Department of Forests & Park Services
7	Mr. B.B. Chhetri, Social Forestry Specialist	Department of Forests & Park Services
8	Mr. K.B. Samal, Watershed Management Specialist	Department of Forests & Park Services
9	Dr. Purna B. Chhetri, Sr. Research Officer	Department of Forests & Park Services
10	Mr. Shacha Dorji, Chief Forest Officer	Department of Forests & Park Services
11	Mr. Ngawang Gyeltshen, Dy. Chief Forest Officer	Department of Forests & Park Services
12	Mrs. Kezang Yangden, Senior Forest Officer	Department of Forests & Park Services
13	Mr. Arun Rai, Senior Forest Officer	Department of Forests & Park Services
14	Mr. Younten Phuntsho, Forest Officer	Department of Forests & Park Services
15	Mr. Phub Dhendup, Forest Officer	Department of Forests & Park Services
16	Dr. M.R. Moktan, Principal Policy and Planning Officer	Council for RNR Research of Bhutan Secretariat
17	Mr. Thinley Namgyel, Chief Environment Officer	National Environment Commission Secretariat
18	Mr. Jigme Wangchuck, Chief Livestock Officer	Department of Livestock
19	Mrs. Karma Dema, Program Director	Department of Agriculture
20	Mr. Chandra Shekar Dhakal, Senior. Finance Officer	Department of Public Accounts, Ministry of Finance
21	Mr. Norbu Wangchuk, Deputy Chief Planning Officer	Gross National Happiness Commission Secretariat
22	Dr. Om Katel, Lecturer	College of Natural Resources, Royal University of Bhutan
23	Mr. Nedup Tshering	National Consultant
24	Mr. Ashit Chettri, Regional Manager	Natural Resources Development Corporation Limited (Corporation)
25	Mr. Chukey Wangchuk Chief Program Officer	Bhutan Trust Fund for Environment Conservation (NGO)
26	Mr. Dago Tshering, Senior Program Officer	Royal Society for Protection of Nature, (NGO)
27	Dr. András Darabant	BC-CAP Project, DoFPS