



Food and Agriculture
Organization of the
United Nations

Lesson 3

Forest and transparency under the Paris Agreement

Lesson 3: Forest data for the Enhanced Transparency Framework under the Paris Agreement

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In this lesson

Learning objectives	2
Introduction	2
The Modalities, Procedures and Guidelines	2
The guiding principles of the MPGs	4
The role of a multipurpose National Forest Monitoring System in the ETF	4
NFMS and quality of data	5
Principles for a sustainable NFMS.....	7
National Forest Monitoring System and the Enhanced Transparency Framework.....	8
Three case studies.....	22
Conclusion.....	25
Summary	26

This lesson discusses how a National Forest Monitoring System (NFMS) that is informed by principles of transparency, accuracy, consistency, completeness and comparability enables countries to produce **reliable** and **transparent data**, and thus to meet the reporting requirements under the Enhanced Transparency Framework (ETF).

Learning objectives

At the end of this lesson, you will be able to:

- understand the Modalities, Procedures and Guidelines (MPGs) of the Enhanced Transparency Framework; and
- understand how National Forest Monitoring Systems (NFMS) can help countries to meet the requirements of the Enhanced Transparency Framework.

Introduction

There is significant mitigation potential in the forest sector that can support the long-term goals of the Paris Agreement.

To meet the ambitious goal of keeping a global temperature rise well below 2 °C above pre-industrial levels, and to pursue efforts to limit the temperature increase even further to 1.5 °C, the Paris Agreement requires that all Parties report regularly on their emissions and removals, and on progress in their Nationally Determined Contribution (NDC) implementation and achievement. A **National Forest Monitoring System can help countries to collect reliable data** in a sustainable manner and to use them for effective reporting under the ETF.

The Modalities, Procedures and Guidelines

The **Modalities, Procedures and Guidelines (MPGs)** were laid out at Katowice in December 2018, and specify how the ETF is to be implemented. They are organized into **eight sections**.

#1 Introduction

Section I is the introduction, where the purpose, guiding principles and some specifications for submitting the Biennial Transparency Report (e.g. where to submit and in what language) are presented.

#2 National inventory report

Section II of the MPGs is about the national Greenhouse Gas Inventory, providing detail on what this should contain, including which national institutions are responsible and which gases and sectors need to be reported. There are specific provisions to provide flexibility to those developing country Parties that need it in the light of their capacities.

#3 Nationally Determined Contributions

Section III is about the information that needs to be submitted in order to track progress towards Article 4 of the Paris Agreement, which refers to the NDCs. To track progress on NDCs, Section III of the MPGs requests Parties to report on any updates to the NDC that may have been made, and progress by indicator, policies and measures.

#4 Climate change impacts and adaptation

In **Section IV**, the MPGs provide information related to climate change impacts and adaptation. Parties should provide information on, for example, projected impacts and risks, barriers to adaptation and existing and planned adaptation strategies.

#5 Support provided and mobilized

Section V is on financial & technology development and transfer and capacity-building support provided and mobilized, including whether the support is climate-specific, the total cost and recipient(s). Developed countries are usually the providers of such support, but other countries may choose to report on it.

#6 Support needed and received

Section VI is the complement to Section V. This gives developing countries an opportunity to provide information on the support that they need to achieve their NDCs, and for implementation of the ETF.

#7 Technical expert review

Section VII is on the technical expert review. This section provides guidance to the experts who will be involved in reviewing the information submitted by Parties, for example what information they should review and how.

#8 Facilitative multilateral consideration of progress

Section VIII is on the facilitative multilateral consideration of progress (FMCP). This section provides details on this, such as timing, scope and format.

The guiding principles of the MPGs

These are the guiding principles of the **MPGs**.

- Ensure double counting is avoided
- Ensure environmental integrity
- Avoid duplication of work and undue burden
- Build on and enhance the transparency arrangements under the Convention
- Provide flexibility to developing country Parties that need it
- Facilitate improved reporting and transparency over time
- Promote transparency, accuracy, completeness, consistency and comparability
- Ensure that Parties maintain the frequency and quality of reporting in accordance with their obligations

The role of a multipurpose National Forest Monitoring System in the ETF

The establishment of a multipurpose **NFMS**¹ will enable countries to meet a variety of objectives, including contributing to the Enhanced Transparency Framework under the Paris Agreement. As we know, the NFMS supports national policies and sustainable forest management practices and assists in national land-use planning.

In addition, an NFMS can support countries in their activities of data collection and reporting. In particular, the NFMS is important in order to monitor forests and provide consistent and reliable data required for both national and international purposes. An NFMS will enable monitoring of various forest-related policies and measures in relation to the achievement of various national targets. For example, for international reporting processes, such as the FRA and SDGs, and for targets reported in countries' NDCs.



NFMS AND THE GLOBAL FOREST RESOURCES ASSESSMENT (FRA)

An NFMS can provide robust data needed for reporting to the **Global Forest Resources Assessment (FRA)**. The FRA variables required include data on the extent of forest area and

¹ **National forest monitoring system (NFMS)** - Comprises the people, institutions and resources that implement national forest monitoring at country level, in collaboration with other stakeholders.

changes and other variables associated with the forest growing stock, such as biomass and carbon, as well as data on other forest characteristics and categories. It is important to note that FRA-reported data are also used to monitor and report on **Sustainable Development Goal 15** (Life on land); that is, the NFMS contributes directly to FRA reporting and SDG monitoring and reporting on Indicators 15.1.1 (Forest area as a proportion of total land area) and 15.2.1 (Progress towards sustainable forest management).

To learn more, you can consult the e-learning course on **SDG Indicators 15.1.1 and 15.2.1**, <https://elearning.fao.org/course/view.php?id=446> available from the FAO elearning Academy.

NFMS and quality of data

There are common guiding principles between the NFMS and the Enhanced Transparency Framework. All information, including any background data and GHG estimates, should be: transparent, accurate, consistent, complete and comparable over time.

➔ Transparency

Transparency means that the data sources, assumptions and methodologies used for an inventory should be clearly explained, in order to facilitate the replication and assessment of the inventory by users of the reported information. For example, the national inventory document, which documents the data sources, assumptions and methodologies used for preparing the national inventory report under the MPGs, aims to contribute to the transparency of information and to facilitate national and international reviews.

Example

Paula is an environmental statistician

Together with the team of analysts, we clearly document every step of the process that we followed in order to estimate the deforestation rate. We make the documents publicly available online. This promotes transparency, as others can see how we reached the estimate, and replicate the method.

➔ Accuracy

Accuracy means that emissions and removal estimates are neither systematically over nor under true emissions and removals, as far as can be judged, and that uncertainties are reduced as far as practicable. Appropriate methodologies should be used, in accordance with the IPCC Guidelines, to promote accuracy in inventories.

Example

Amir is a forest officer

The task of my team is to investigate the status of national forests. We very carefully record the diameter of every tree, using established methods and based on our sampling design, avoiding any errors when writing this down. This helps us to reduce measurement errors, which would affect the accuracy of our forest biomass estimation.

Consistency

Consistency means that an annual GHG inventory should be internally consistent for all reported years in all its elements, across sectors, categories and gases. An inventory is consistent if the same methodologies are used for the base and all subsequent years, and if consistent data sets are used to estimate emissions or removals from sources or sinks.

Example

Lama's team developed a new allometric equation.

We use this improved equation to calculate biomass stock this year, but also to recalculate biomass stocks for all previous years. This ensures consistency, as trends observed in biomass stocks represent real change, rather than being due to the fact that the methodology was altered.

Comparability

Comparability means that estimates of emissions and removals reported by countries should be comparable among countries. For that purpose, countries should use the methodologies and formats agreed for making estimations and reporting their inventories.

Example

Carlos is a senior forest officer

We normally measure tree heights in yards, but in order to be comparable with neighbouring countries, we will convert these to meters. We also use the same methods for comparability.

Completeness

Completeness means that an annual GHG inventory covers at least all sources and sinks, as well as all gases, for which methodologies are provided in the IPCC Guidelines, or for which supplementary

methodologies have been agreed. Completeness also means full geographical coverage of the sources and sinks of a country.

Example

Chania is a mangrove biologist involved in her country's NFI

My country is lucky to have extensive mangrove forests, but in the past, it was not possible to conduct inventories there, due to the tides and crocodiles! We established a special mangrove team with expertise and suitable gear to ensure data collection under these challenging conditions. Now we have a complete national inventory.

Principles for a sustainable NFMS

FAO recommends that the NFMS be developed following the **principles identified in the Voluntary guidelines on national forest monitoring**. They include five groups of principles:

Governance (Refer to institutional settings and governance)

Principle 1 Country ownership and responsibility

Principle 2 Legal and policy basis

Principle 3 Landscape view

Principle 4 Institutionalization of NFM

Principle 5 Research infrastructure and capacity-building

Scope (Refer to the identification of information needs)

Principle 6 Participatory discussion process

Principle 7 Satisfaction of national information needs

Design (Refer to institutional settings and governance)

Principle 8 Integration of and consistency with existing information sources

Principle 9 Flexible approach

Principle 10 Multipurpose approach

Principle 11 Feasibility including cost-efficiency

Data (Refer to information generation, reporting and dissemination, and in particular to data availability)

Principle 12 A well-defined data and information-sharing policy

Overall principles (Refer to data collection and analyses)**Principle 13 Credibility through transparency and quality****Principle 14 Collaboration at the international level****National Forest Monitoring System and the Enhanced Transparency Framework**

An NFMS based on the principles examined so far will help a country to lay the foundations for meeting the ETF reporting requirements laid out in the MPGs. A well-established NFMS is key to providing robust and consistent **forest-related data to assess and report forest-related emissions and removals** through the national inventory report, and for tracking progress towards achieving a country's Nationally Determined Contribution.

FOREST-RELATED EMISSIONS AND REMOVALS

An NFMS can provide reliable forest resource information that is essential for various reporting purposes. In accordance with the methodology, of the Intergovernmental Panel on Climate Change (IPCC), activity data and emission factors are required for the estimation of national forest-related emissions and removals. Activity data are related to forest area and its changes, as well as to harvested wood and its derived products, and are collected and monitored by the NFMS. In addition, country-specific carbon-stock-change-factors, hereafter generally referred as emission factors on other parameters (e.g. biomass increment, mortality rate, above-ground biomass and soil carbon stocks, root-to-shoot ratio, dead wood and litter stocks) are collected through a national forest inventory (NFI) planned under an NFMS.



To learn more about the preparation of a national GHG gas Inventory for the land-use sector, you can consult the FAO e-learning course **The national Greenhouse Gas Inventory for land use** <https://elearning.fao.org/course/view.php?id=453>

To produce reliable and transparent data, the legal and institutional basis of an NFMS is fundamental. The examples of Ecuador and Uganda show how this can be achieved.

Example: Uganda and Ecuador

In Uganda, a comprehensive review was recently conducted of the national NFMS's roles and responsibilities. Institutional mandates and the Government's responsibilities in relation to the forestry sector were clearly defined. Particular attention was paid to strengthening coordination

among key entities, guaranteeing financial sustainability (principally for staffing and clarifying data access rights).

In Ecuador, on June 2019, the Ministry of Environment adopted a Ministerial Agreement to enact institutional guidelines for the functioning of the NFMS. This served to ensure that the NFMS was more institutionalized, that integrated forest management was improved, and that there was compliance with relevant national and international commitments.

Establishing the institutionalization of an NFMS and its legal and policy basis ensures continuity in the collection, analysis and dissemination of reliable data, and is therefore key to the Enhanced Transparency Framework. This is recognized in Principles 2 and 4 of the VGNFM (Governance).

Principles 2 - 4

MPGs, Section II, B. 18

MPGs, Section III, A. 59-62

MPGs, Section IV, A. 106 b-c

GOVERNANCE Institutional arrangements refer to the policies, systems and processes that organizations use to legislate, plan and manage their activities efficiently, and to effectively coordinate with others in order to fulfil their mandate.



A permanently institutionalized NFMS will contribute to meeting the institutional arrangements necessary to support implementation of the ETF in a country.

In particular:

→ An institutionalized NFMS allows countries to plan and manage the national inventory report, as indicated in Section II of the MPGs.

MPGs, Section II, B. 19

B. National circumstances and institutional arrangements

II National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases

19. Each Party shall report on the following functions related to inventory planning, preparation and management:

- a) Its national entity or national focal point with overall responsibility for the national inventory;

- b) Its inventory preparation process, including division of specific responsibilities of institutions participating in the inventory preparation to ensure that sufficient activity data collection, choice and development of methods, emission factors and other parameters are in accordance with the IPCC guidelines referred to in paragraph 20 below and these MPGs;
- c) Its archiving of all information for the reported time series, including all disaggregated emission factors and activity data, all documentation about generating and aggregating data, including quality assurance/quality control (QA/QC), review results and planned inventory improvements;
- d) Its processes for the official consideration and approval of the inventory.

Source: [Annex of decision 18/CMA.1](#)

→ Institutional arrangements are essential for tracking progress towards the implementation and achievement of NDCs under Art. 4 of the Paris Agreement.

MPGs, Section III, A. 59-62

A. National circumstances and institutional arrangements

III. Information necessary to track progress made in implementing and achieving nationally determined contributions under Article 4 of the Paris Agreement

59. Each Party shall describe its national circumstances relevant to progress made in implementing and achieving its NDC under Article 4 of the Paris Agreement, including:

- a) Government structure;
- b) Population profile;
- c) Geographical profile;
- d) Economic profile;
- e) Climate profile;
- f) Sector details.

60. Each Party shall provide information on how its national circumstances affect GHG emissions and removals over time.

61. Each Party shall provide information on the institutional arrangements in place to track progress made in implementing and achieving its NDC under Article 4, including those used for tracking internationally transferred mitigation outcomes, if applicable, along with any changes in institutional arrangements since its most recent biennial transparency report.

62. Each Party shall provide information on legal, institutional, administrative and procedural arrangements for domestic implementation, monitoring, reporting, archiving of information and stakeholder engagement related to the implementation and achievement of its NDC under Article 4.

Source: *Annex of decision 18/CMA.1*

→ They are also essential for assessing climate change impacts and adaptation in the forest sector, in accordance with Section IV.

MPGs, Section IV, A. 106 b-c

IV. Information related to climate change impacts and adaptation under Article 7 of the Paris Agreement

A. National circumstances, institutional arrangements and legal frameworks

106. Each Party should provide the following information, as appropriate:

(...)

b) Institutional arrangements and governance, including for assessing impacts, addressing climate change at the sectoral level, decision-making, planning, coordination, addressing cross-cutting issues, adjusting priorities and activities, consultation, participation, implementation, data governance, monitoring and evaluation, and reporting.

c) Legal and policy frameworks and regulations.

Source: *Annex of decision 18/CMA.1*

Once countries have set up the institutional and legal structure of their NFMS, technical skills and capacity-building should be considered.

The MPGs have provisions to implement improved reporting and transparency over time.

Parties shall report projections of greenhouse gas emissions and removals. Many countries are implementing effective strategies and measures to improve national capacities, as you can read in the examples of Cambodia and Mongolia.

Example Cambodia and Mongolia

Cambodia

Under its national REDD+ programme, Cambodia fostered capacity-building of the Royal Agricultural University of Cambodia. **University staff were trained** in conducting forest inventory and modelling, so as to be able **to train other staff** and students independently and transfer knowledge on these topics.

Mongolia has taken care to **institutionalize and maintain national capacities** in forest data management. National experts run provincial training sessions in different areas of the country, and universities and research institutes are involved. Source:
<http://reddplus.mn/eng/training-forest-units-in-data-collection-and-database-management/>

Principle 5

MPGs, Section I, D. 7

MPGs, Section III, F. 92-96

GOVERNANCE - The importance of strengthening research and capacity-building is clearly stated in Principle 5 of the VGNFM and is closely linked to Principle 4. Strengthening research will enable countries to identify research needs and priorities to fill data gaps, thereby contributing to improving the NFMS, and helping to implement the ETF as a result.

In particular:

→ Strengthening research and building technical skills will ensure improved reporting and transparency over time, in accordance with the guideline reported in Section I of the MPGs.

MPGs, Section I, D. 7

D. Facilitating improved reporting and transparency over time

7.To facilitate continuous improvement, each Party should, to the extent possible, identify, regularly update and include as part of its biennial transparency report information on areas of improvement in relation to its reporting pursuant to chapters II, III, IV, V and VI of these MPGs, including, as applicable:

- a) Areas of improvement identified by the Party and the technical expert review team in relation to the Party's implementation of Article 13 of the Paris Agreement;
- b) How the Party is addressing or intends to address areas of improvement as referred to in paragraph 7(a) above, as appropriate;
- c) Those developing country Parties that need flexibility in the light of their capacities are encouraged to highlight the areas of improvement that are related to the flexibility provisions used;
- d) Identification of reporting-related capacity-building support needs, including those referred to in paragraph 6 above, and any progress made, including those previously identified as part of the technical expert review referred to in chapter VII below.

8. Parties' domestic plans and priorities with regard to improved reporting reported pursuant to paragraph 7 above are not subject to technical expert review, but the information may inform discussions on areas of improvement and identification of capacity-building needs between the technical expert review team and the Party concerned.

Source: *Annex of decision 18/CMA.1*

→ A strengthened research infrastructure will provide opportunities for developing robust models and other parameters that are needed to estimate emissions projections, and will thus contribute to assessing the impacts of forest-related mitigation activities on GHG emissions and removals trends.

MPGs, Section III, F. 92-96

III. Information necessary to track progress made in implementing and achieving nationally determined contributions under Article 4 of the Paris Agreement

F. Projections of greenhouse gas emissions and removals, as applicable

92. Each Party shall report projections pursuant to paragraphs 93-101 below; those developing country Parties that need flexibility in the light of their capacities are instead encouraged to report these projections.

93. Projections are indicative of the impact of mitigation policies and measures on future trends in GHG emissions and removals, and shall not be used to assess progress towards the implementation and achievement of a Party's NDC under Article 4 of the Paris Agreement, unless the Party has identified a reported projection as its baseline as identified in chapter III.B above.

94. Each Party that reports pursuant to paragraph 92 above shall report a 'with measures' projection of all GHG emissions and removals and may report a 'with additional measures' projection and a 'without measures' projection.¹

95. Projections shall begin from the most recent year in the Party's national inventory report and extend at least 15 years beyond the next year ending in zero or five; those developing country Parties that need flexibility in the light of their capacities with respect to this provision have the flexibility to instead extend their projections at least to the end point of their NDC under Article 4 of the Paris Agreement.

96. Each Party should provide information in describing the methodology used to develop the projections. This information should include:

- a) Models and/or approaches used and key underlying assumptions and parameters used for projections (e.g. gross domestic product growth rate/level, population growth rate/level);
- b) Changes in the methodology since the Party's most recent Biennial Transparency Report;

- c) Assumptions on policies and measures included in the ‘with measures’ projections and ‘with additional measures’ projections, if included;
- d) Sensitivity analysis for any of the projections, together with a brief explanation of the methodologies and parameters used.

Source: Annex of decision 18/CMA.1

Once the NFMS has been institutionalized and is founded on the necessary technical skills, it will need to ensure reliable and transparent data. An NFMS should build on existing forest-related data collection systems. This is also important for economic and technical optimization. Using a wide range of data sources may provide better insights into the reasons for GHG emissions and removal trends and drivers for forest cover changes. Comparability and consistency are key elements to providing timely and reliable forest-related data.

Principle 8

MPGs, Section II, C. 3. 26-28

MPGs, Section II, C. 5, 30-33

MPGs, Section II, E. 2. 47-50

Robust, transparent, and comprehensive NFMS data will contribute to ensuring time-series consistency and eventually support reporting under the ETF.

In particular:

Section II of the MPGs highlights the importance of time-series consistency. NFMS is a key source of information for activity data from the forest sector.

MPGs, Section II, C. 3.26-28

II. National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases

C. Methods

3. Time-series consistency and recalculations

26. To ensure time-series consistency, each Party should use the same methods and a consistent approach to underlying activity data and emission factors for each reported year.

27. Each Party should use surrogate data, extrapolation, interpolation and other methods consistent with splicing techniques contained in the IPCC guidelines referred to in paragraph 20 above to estimate

missing emission values resulting from lack of activity data, emission factors or other parameters in order to ensure a consistent time series.

28. Each Party shall perform recalculations in accordance with the IPCC guidelines referred to in paragraph 20 above, ensuring that changes in emission trends are not introduced as a result of changes in methods or assumptions across the time series.

Source: Annex of decision 18/CMA.1

Integrating existing information into the NFMS will contribute to preparing a complete national GHG inventory covering all categories, pools and gases. This is critical to provide comprehensive estimates of forest-related emissions and removals, as required by the MPGs.

MPGs, Section II, C. 50. 47-50

II. National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases

C. Methods

5. Assessment of completeness

30. Each Party should indicate the sources and sinks (categories, pools and gases) that are not considered in the national inventory report but for which estimation methods are included in the IPCC guidelines referred to in paragraph 20 above and explain the reasons for such exclusion.

31. Each Party shall use notation keys where numerical data are not available when completing common reporting tables, indicating the reasons why emissions from sources and removals by sinks and associated data for specific sectors, categories and subcategories or gases are not reported. These notation keys include:

- a) "NO" (not occurring) for categories or processes, including recovery, under a particular source or sink category that do not occur within a Party;
- b) "NE" (not estimated) for activity data and/or emissions by sources and removals by sinks of GHGs that have not been estimated, but for which a corresponding activity may occur within a Party;
- c) "NA" (not applicable) for activities under a given source/sink category that do occur within the Party but do not result in emissions or removals of a specific gas;
- d) "IE" (included elsewhere) for emissions by sources and removals by sinks of GHGs estimated but included elsewhere in the inventory, instead of under the expected source/sink category;
- e) "C" (confidential) for emissions by sources and removals by sinks of GHGs where the reporting would involve the disclosure of confidential information.

32. Each Party may use the notation key “NE” (not estimated) when the estimates would be insignificant in terms of level according to the following considerations: emissions from a category should only be considered insignificant if the likely level of emissions is below 0.05 percent of the national total GHG emissions, excluding LULUCF, or 500 kilotonnes of carbon dioxide equivalent (kt CO₂-eq), whichever is lower. The total national aggregate of estimated emissions for all gases from categories considered insignificant shall remain below 0.1 percent of the national total GHG emissions, excluding LULUCF. Parties should use approximated activity data and default IPCC emission factors to derive a likely level of emissions for the respective category. Those developing country Parties that need flexibility in the light of their capacities with respect to this provision have the flexibility to instead consider emissions insignificant if the likely level of emissions is below 0.1 percent of the national total GHG emissions, excluding LULUCF, or 1 000 kt CO₂-eq, whichever is lower. The total national aggregate of estimated emissions for all gases from categories considered insignificant, in this case, shall remain below 0.2 percent of the national total GHG emissions, excluding LULUCF.

33. Once emissions or removals have been estimated for a category and if they continue to occur, each Party shall report them in subsequent submissions.

Source: Annex of decision 18/CMA.1

Section II, E. 2.47-50

II. National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases

E. Reporting guidance

2. Sectors and gases

47. Each Party shall report estimates of emissions and removals for all categories, gases and carbon pools considered in the GHG inventory throughout the reported period on a gas-by-gas basis in units of mass at the most disaggregated level, in accordance with the IPCC guidelines referred to in paragraph 20 above, using the common reporting tables, including a descriptive summary and figures underlying emission trends, with emissions by sources listed separately from removals by sinks, except in cases where it may be technically impossible to separate information on emissions and removals in the LULUCF sector, and noting that a minimum level of aggregation is needed to protect confidential business and military information.

48. Each Party shall report seven gases (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆) and nitrogen trifluoride (NF₃); those

developing country Parties that need flexibility in the light of their capacities with respect to this provision have the flexibility to instead report at least three gases (CO₂, CH₄ and N₂O), as well as any of the additional four gases (HFCs, PFCs, SF₆ and NF₃) that are included in the Party's NDC under Article 4 of the Paris Agreement, are covered by an activity under Article 6 of the Paris Agreement, or have been previously reported.

49. Each Party reporting HFCs, PFCs, SF₆ and NF₃ shall report actual emissions of the gases, providing disaggregated data by chemical (e.g. HFC-134a) and category in units of mass and in CO₂-eq.

50. Each Party shall report the following sectors: energy, industrial processes and product use, agriculture, LULUCF and waste, according to the IPCC guidelines referred to in paragraph 20 above.

Source: *Annex of decision 18/CMA.1*

The further two principles that we will examine relate to the quality of the data and, consequently, to the quality of reporting. The importance of a clear data-sharing policy and of the transparency and quality of data produced by an NFMS are highlighted in Principles 12 and 13 of the VGNFM.

The experiences of some countries are positive in this respect, as you can see from the examples of Mexico and Sri Lanka.

Example Mexico and Sri Lanka

In Sri Lanka, in order to facilitate the establishment of the NFMS, several institutions entered into a data-sharing agreement under the auspices of the Forest Department.

The data-sharing agreement may be considered an interim measure before reinforcing the institutional arrangements among various national entities; nevertheless it has been instrumental in advancing the establishment of the NFMS.

Mexico has made laws about data sharing, set up data-sharing agreements between institutions, made its data, including those on forests, publicly available online, and published guidelines to help make data transparent and consistent. All this assists decision-making at national and subnational level, by private and public entities.

PRINCIPLE 12: A well-defined data and information-sharing policy

Introducing a well-defined data-sharing policy effectively supports country goals and contributes to the ETF requirements. In particular:

The availability of information from an NFMS will support countries in providing information on methods and cross-cutting issues, as indicated in the MPGs.

MPGs, Section II, E. 1.39-40

II. National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases

E. Reporting guidance

1. Information on methods and cross-cutting elements

39. Each Party shall report methods used, including the rationale for the choice of methods, in accordance with good practice elaborated in the IPCC guidelines referred to paragraph 20 above, and the descriptions, assumptions, references and sources of information used for the emission factors and activity data used to compile the GHG inventory.

40. Each Party shall provide information on the category and gas, and the methodologies, emission factors and activity data used at the most disaggregated level, to the extent possible, according to the IPCC guidelines referred to in paragraph 20 above, including related data references for reported emission and removal estimates for any country-specific category and gas that is not included in the IPCC guidelines referred to in paragraph 20 above.

Source: Annex of decision 18/CMA.1

Improving data accessibility and availability will help countries to provide descriptions of the underlying assumptions and sources of information, as required in Section III of the MPGs.

MPGs, Section III, C. 75

III. Information necessary to track progress made in implementing and achieving nationally determined contributions under Article 4 of the Paris Agreement

C. Information necessary to track progress made in implementing and achieving its nationally determined contribution under Article 4 of the Paris Agreement

75. The information referred to in paragraph 74 above shall include, as applicable and available to the Party's NDC under Article 4:

- a) Key parameters, assumptions, definitions, data sources and models used;
- b) IPCC guidelines used;
- c) Metrics used;

- d) Where applicable to its NDC, any sector-, category- or activity-specific assumptions, methodologies and approaches consistent with IPCC guidance, taking into account any relevant decision under the Convention, including as applicable:
- (i) The approach used to address emissions and subsequent removals from natural disturbances on managed lands;
 - (ii) The approach used to account for emissions and removals from harvested wood products;
 - (iii) The approach used to address the effects of age-class structure in forests;
- e) Methodologies used to estimate mitigation co-benefits of adaptation actions and/or economic diversification plans;
- f) Methodologies associated with any cooperative approaches that involve the use of internationally transferred mitigation outcomes towards its NDC under Article 4, consistent with CMA guidance on cooperative approaches under Article 6;
- g) Methodologies used to track progress arising from the implementation of policies and measures;
- h) Any other methodologies related to its NDC under Article 4;
- i) Any conditions and assumptions relevant to the achievement of its NDC under Article 4.

Source: Annex of decision 18/CMA.1

PRINCIPLE 13: Credibility through transparency and quality

An NFMS provides information and data that can be used to prepare estimates of forest-related emissions and removals in Greenhouse Gas Inventories, helping to implement the transparency framework. In particular:

Data from the NFMS go through QA/QC processes to ensure their quality, and will then contribute to the ETF.

MPGs, Section II, C. 6.34-35

II. National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases

C. Methods

6. Quality assurance/quality control

34. Each Party shall elaborate an inventory QA/QC plan in accordance with the IPCC guidelines referred to in paragraph 20 above, including information on the inventory agency responsible for implementing

QA/QC; those developing country Parties that need flexibility in the light of their capacities with respect to this provision are instead encouraged to elaborate an inventory QA/QC plan in accordance with the IPCC guidelines referred to in paragraph 20 above, including information on the inventory agency responsible for implementing QA/QC.

35. Each Party shall implement and provide information on general inventory QC procedures in accordance with its QA/QC plan and the IPCC guidelines referred to in paragraph 20 above; those developing country Parties that need flexibility in the light of their capacities with respect to this provision are instead encouraged to implement and provide information on general inventory QC procedures in accordance with its QA/QC plan and the IPCC guidelines referred to in paragraph 20 above. In addition, Parties should apply category-specific QC procedures in accordance with the IPCC guidelines referred to in paragraph 20 above for key categories and for those individual categories in which significant methodological changes and/or data revisions have occurred. In addition, Parties should implement QA procedures by conducting a basic expert peer review of their inventories in accordance with the IPCC guidelines referred to in paragraph 20 above.

36. Each Party should compare the national estimates of CO₂ emissions from fuel combustion with those obtained using the reference approach, as contained in the IPCC guidelines referred to in paragraph 20 above, and report the results of this comparison in its national inventory report.

Source: *Annex of decision 18/CMA.1*

In addition, having transparent documentation of data will facilitate the technical expert review process of the emissions inventory.

MPGs, Section VII, B. 150 a-b

VII. Technical expert review

B. Information to be reviewed

150. Information submitted under Article 13, paragraphs 7 and 9, of the Paris Agreement shall undergo a technical expert review consistent with the MPGs contained in this chapter. This includes:

- a) A national inventory report of anthropogenic emissions by sources and removals by sinks of GHGs, as referred to in paragraph 10(a) above, submitted by each Party;
- b) Information necessary to track progress made in implementing and achieving its NDC under Article 4, as referred to in paragraph 10(b) above, submitted by each Party.

Source: *Annex of decision 18/CMA.1*

Finally, these principles are strictly related to the reporting requirements of the MPGs.

PRINCIPLES 6, 7 AND 10 AND THE MPGS

The NFMS will need to define how data will be collected, analysed and made available in a participatory process, involving key national stakeholders. This is defined in Principles 6, 7 and 10.

Equally, the MPGs highlight the importance of planning and preparation to ensure sufficient activity data collection. In particular:

Section II requires countries to implement and maintain national inventory arrangements.

III. Information necessary to track progress made in implementing and achieving nationally determined contributions under Article 4 of the Paris Agreement

C. Information necessary to track progress made in implementing and achieving its nationally determined contribution under Article 4 of the Paris Agreement

65. Each Party shall identify the indicator(s) that it has selected to track progress towards the implementation and achievement of its NDC under Article 4. Indicators shall be relevant to a Party's NDC under Article 4, and may be either qualitative or quantitative.

66. These indicators could include, as appropriate, for example: net GHG emissions and removals, percentage reduction of GHG intensity, relevant qualitative indicators for a specific policy or measure, mitigation co-benefits of adaptation actions and/or economic diversification plans or other (e.g. hectares of reforestation, percentage of renewable energy use or production, carbon neutrality, share of non-fossil fuel in primary energy consumption and non-GHG related indicators).

67. Each Party shall provide the information for each selected indicator for the reference point(s), level(s), baseline(s), base year(s) or starting point(s), and shall update the information in accordance with any recalculation of the GHG inventory, as appropriate.

68. Each Party shall provide the most recent information for each selected indicator identified in paragraph 65 above for each reporting year during the implementation period of its NDC under Article 4.

Source: *Annex of decision 18/CMA.1*

Section III requires countries to identify indicators to track progress towards the implementation and achievements of their NDCs

I. National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases

B. National circumstances and institutional arrangements

19. Each Party shall report on the following functions related to inventory planning, preparation and management:

(...)

b) Its inventory preparation process, including division of specific responsibilities of institutions participating in the inventory preparation to ensure that sufficient activity data collection, choice and development of methods, emission factors and other parameters are in accordance with the IPCC guidelines referred to in paragraph 20 below and these MPGs;

c) Its archiving of all information for the reported time series, including all disaggregated emission factors and activity data, all documentation about generating and aggregating data, including quality assurance/quality control (QA/QC), review results and planned inventory improvements;

(...)

Source: Annex of decision 18/CMA.1

Three case studies

As reviewed, establishing a robust, efficient, multipurpose and transparent NFMS can support countries in their reporting efforts.

The efficient planning and implementation of a forest monitoring system requires long-term efforts and resources and an appropriate legislative and institutional framework.

Case studies: Costa Rica, Democratic Republic of the Congo and Bangladesh**→ Costa Rica**

This provides more consistent, accurate, comparable, complete and transparent information on the land-use sector at national scale. Costa Rica has developed a National Land-Use, Land Cover and Ecosystem Monitoring System known as SIMOCUTE².

Ownership of SIMOCUTE comes under the Ministry of Environment and Energy and the Ministry of Agriculture and Livestock.

² **SIMOCUTE:** Sistema Nacional de Monitoreo de la Cobertura y Uso de la Tierra y Ecosistemas.

SIMOCUTE is a decentralized system where different institutions and entities share their data and information, according to their mandates and roles, and on the basis of established requirements and standards.

SUCCESS FACTORS OF THIS PROJECT

Country ownership and responsibility

SIMOCUTE is implemented through interinstitutional coordination that began with 11 institutions and currently stands at 25.

Institutionalization

SIMOCUTE is led by CENIGA (Centro Nacional de Información Geoambiental) within the context of the National Environmental Information System. Clear roles and responsibilities are defined by legislation establishing the interinstitutional arrangements.

Legal and policy basis

An interministerial decree regulating the functioning of SIMOCUTE is under final consultation.

Landscape approach

SIMOCUTE is an all-lands, multipurpose system allowing for the monitoring of natural ecosystems as well as agricultural and biodiversity resources.

Participatory discussion process

Interinstitutional discussion has been promoted within working groups to harmonize and integrate methodologies.

→ Democratic Republic of the Congo

In the Democratic Republic of the Congo (DRC) reducing emissions from deforestation and forest degradation is a national strategic issue. Thanks to the NFMS data, DRC will be able to review its Nationally Determined Contribution by December 2020. **Estimates of GHG emissions and removals will be improved**, enabling an enhanced understanding of the impact of various projects and programmes on REDD+ emissions.

The National Forest Monitoring System is implemented by the Sustainable Development Directorate and Directorate of Forest Inventories and Management under the Ministry of the Environment and Sustainable Development. The NFMS was initiated by the UN-REDD National Programme.

Institutional collaboration was strengthened and a **technical consultation platform** was established to ensure better coordination between partners.

Access to high-resolution satellite images has enabled improved estimates of GHG emissions and removals.

SUCCESS FACTORS OF THIS PROJECT

Multipurpose approach

The DRC REDD+ National Fund, which serves as a financial vehicle for implementation of the National REDD+ Strategy (FONAREDD: Fonds National REDD) and is funded by the Central African Forest Initiative (CAFI), is also using the NFMS as a tool to provide useful information to stakeholders outside the forestry sector, such as economic actors and investors and for land-use planning.

Participatory discussion process

The design and implementation of the NFMS have been supported by a variety of actors, including: the University of Lubumbashi, University of Kisangani, Wildlife Conservation Society, World Resources Institute, Japan International Cooperation Agency, Satellite Observatory for the Forests of Central Africa, The US Forest Services, the French Institute of Research and Development and national NGOs, such as SOS-Nature, Les Aiglons and Laboratoire d'Ecologie du Paysage et Foresterie Tropicale. In addition, collaboration and coordination between relevant stakeholders has been strengthened. This collaboration has been enhanced thanks to the existence of Technical Exchange Platforms on NFMS issues.

→ Bangladesh

In 2018, the Bangladesh Forest Department launched the Bangladesh Forest Information System (BFIS). This is the testimony of the Chief Conservator of Forests, Bangladesh Forest Department: *The BFIS will contribute to preserving and maintaining all scattered information in one place and therefore the Bangladesh Forest Department has a key role in contributing towards the goal of Digital Bangladesh.*

BFIS is the country's first forest information system to assess, monitor, document, plan and implement forest management and conservation activities.

It is an integrated system where all forest-related information is organized into four categories:

(1) development activities

(2) management and conservation

(3) forest assessment

(4) knowledge management

SUCCESS FACTORS OF THIS PROJECT

Country ownership and responsibility

The Resources Information Management System of the Bangladesh Forest Department (BFD) is responsible for managing and updating the BFIS and its modules. Currently, BFD is developing the 'Site-specific planning' and 'Plantation' modules, and several other modules are under design.

Institutionalization

A service-level agreement was signed between the BFD and the Bangladesh Computer Council to ensure the sustainable management and maintenance of the BFIS.

Integration of and consistency with existing information sources

The BFIS GeoPortal, a module of BFIS, is compatible with the ISO standard LCCS (Land Cover Classification System) for producing consistent and comparable land-cover classifications. It is also interoperable with GeoNode, an open source geospatial content management system for interacting with and sharing geospatial data. An ARcGIS plugin was developed to upload large data files in BFIS GeoPortal, as well as other data formats such as GeoDB.

Feasibility including cost-efficiency

Long-term funding is secured with the active participation of more stakeholders. Currently, under the Sustainable Forests and Livelihoods (SUFAL) project funded by the World Bank, the BFIS platform is being updated.

Conclusion

Transparency, accuracy, consistency, completeness and comparability are the same guiding principles of both national forest monitoring and the Enhanced Transparency Framework

Following the adoption of the Paris Agreement and of the MPGs in 2018, transparency and the mechanism through which transparency is enabled will become the backbone of the reporting activities for climate change mitigation and adaptation. At the same time, establishing a solid technical and functional foundation will lead to a sustainable NFMS able to produce reliable and transparent data.

As shown in this lesson, there is a strong interrelation between NFM and the ETF in terms of the common objective of improving the quality of reporting, and ultimately supporting all efforts towards climate change adaptation and mitigation.

Summary

A well-established National Forest Monitoring Systems (NFMS) is key to providing robust and consistent forest-related data to assess and report forest-related emissions and removals through the national inventory report, and for tracking progress towards achieving a country's Nationally Determined Contribution (NDC).

In particular, it should have a solid legal and institutional basis, and should support research and capacity-building. The data and information collected, managed and archived under an NFMS should be accessible to different users and a clear data-sharing policy should be formulated and endorsed.

The principles and elements indicated in the VGNFM are related to the reporting requirements under the Enhanced Transparency Framework and allow countries to meet these requirements and thus contribute to climate change mitigation.