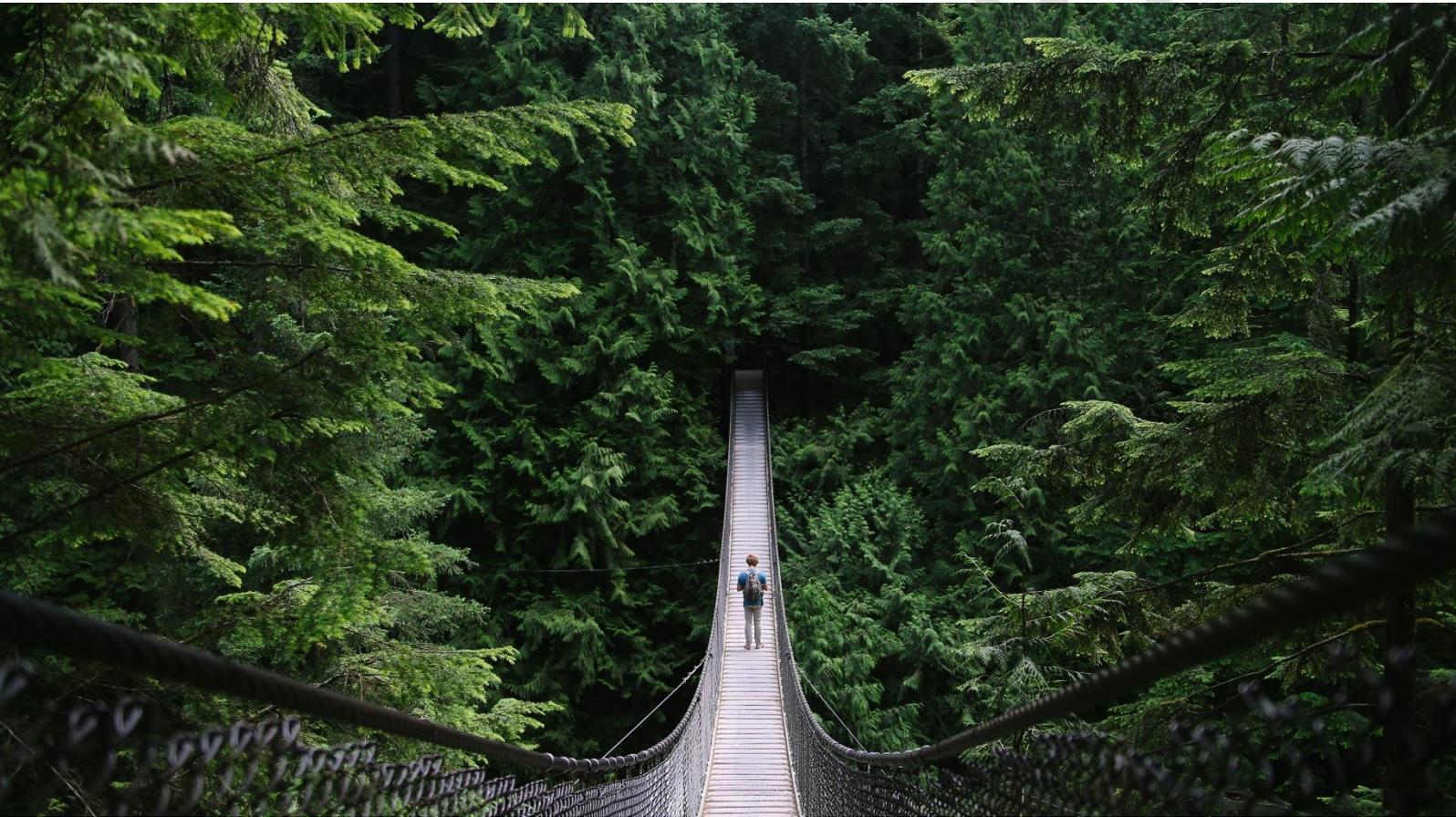




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# Guidelines for the Development of a Criteria and Indicator Set for Sustainable Forest Management



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# **Guidelines for the Development of a Criteria and Indicator Set for Sustainable Forest Management**

Guidelines to support the project “Accountability Systems for Sustainable Forest Management in the Caucasus and Central Asia” which is implemented through the UNECE and FAO Forestry and Timber Section and funded through UNDA

**These guidelines were prepared by:** Ms. Stefanie Linser

Mr. Peter O’Hara

### **Note**

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### **Abstract**

Criteria and indicators constitute an increasingly common policy tool to implement sustainable forest management (SFM) and to define clear priorities and targets. This should improve monitoring, reporting and assessment of key aspects of SFM performance. These guidelines provide specific concepts, definitions, tools and reference materials to guide the development process of national criteria and indicator sets for SFM. These guidelines have been developed to support the project “Accountability Systems for Sustainable Forest Management in the Caucasus and Central Asia” which is implemented through the UNECE and FAO Forestry and Timber Section and funded through the UN Development Account. The guidelines and the methods described within are used and applied for the development of national criteria and indicator sets for sustainable forest management in Armenia, Georgia, Kazakhstan, Kyrgyzstan and Uzbekistan. The guidelines might be also relevant for other countries.

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		3. The Why? Demand for C&I for SFM in the Caucasus and Central Asia
		4. The How? Development of national C&I for SFM
		5. Examples of regional C&I sets
		Annex 2: Shopping list of indicators
		Annex 3: Subsets of forest related indicators to address specific policy issues
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## Abbreviations

<b>ACTO</b>	Amazon Cooperation Treaty Organization
<b>ASEAN</b>	Association of Southeast Asian Nations
<b>ATO</b>	African Timber Organization
<b>C&amp;I</b>	Criteria and indicators
<b>CBD</b>	Convention on Biological Diversity
<b>CEC</b>	Cation exchange capacity
<b>CFRQ</b>	Collaborative Forest Resources Questionnaire
<b>CIFOR</b>	Center for International Forestry Research
<b>CMEF</b>	EC Common Monitoring and Evaluation Framework for Rural Development Indicators
<b>EEA</b>	European Environment Agency
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>FMU</b>	Forest Management Unit
<b>FRA</b>	FAO Forest Resource Assessment
<b>GDP</b>	Gross Domestic Product
<b>IAEG</b>	UN Inter-Agency Expert Group on SDG indicators
<b>IAF</b>	International Arrangement on Forests
<b>ILO</b>	International Labour Organization
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>ITTO</b>	International Tropical Timber Organization
<b>IUCN</b>	International Union for Conservation of Nature and Natural Resources
<b>JFSQ</b>	Joint Forest Sector Questionnaire (collects data on removals, production and trade of wood and wood products. Statistics are collected annually, and the collection is co-ordinated by a number of international organizations: Eurostat, UNECE, FAO and ITTO)
<b>JQ</b>	Joint questionnaire
<b>JWEE</b>	Joint Wood Energy Enquiry of the UNECE/FAO Forestry and Timber Section, Joint ECE/FAO Working Party on Forest Statistics, International Energy Agency, FAO and the European Commission.
<b>LFCC</b>	Low Forest Cover Countries
<b>MCPFE</b>	Ministerial Conference on the Protection of Forests in Europe (FOREST EUROPE)
<b>NFI</b>	National Forest Inventory
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>PFE</b>	Permanent forest estate
<b>R&amp;D</b>	Research & Development
<b>SDG</b>	UN Sustainable Development Goal
<b>SFM</b>	Sustainable Forest Management
<b>UNCCD</b>	United Nations Convention to Combat Desertification
<b>UNDA</b>	United Nations Development Account
<b>UNECE</b>	United Nations Economic Commission for Europe
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>UNFF</b>	United Nations Forum on Forests
<b>WS</b>	Workshop
<b>yr</b>	year

# **1 Introduction**

## **1.1 Purpose of the guidelines**

This document provides specific concepts, definitions, tools and reference materials to help guide the development process of national Criteria and Indicator (C&I) sets for sustainable forest management (SFM) in the Caucasus and Central Asian countries of the UN Economic Commission for Europe (UNECE) and Food and Agriculture Organization of the UN (FAO) and UN Development Account (UNDA) project “Accountability Systems for Sustainable Forest Management in the Caucasus and Central Asia” 2016-2019. Much of the guidance will also be relevant to C&I for SFM development processes elsewhere.

Criteria and indicators constitute an increasingly common policy tool to implement SFM and to define clear priorities and targets. This should improve monitoring, reporting and assessment of key aspects of SFM performance.

## **1.2 Project objectives**

The principal objective of the UNECE/FAO, UNDA project on “Accountability Systems for Sustainable Forest Management in the Caucasus and Central Asia” is to strengthen the national capacity of five countries (Armenia, Georgia, Kazakhstan, Kyrgyzstan and Uzbekistan) to identify C&I that are practicable; easily communicated; measurable; feasible and that can be used to assess sustainable forest management in each country.

The process of developing national C&I sets combines the priorities and specific national needs of each country with international experience of existing regional and international C&I sets. The project should enable countries to actively participate in international forest-related processes and contribute to the sustainable development of the forest sector in moving towards a green economy.

## **1.3 Target audience of the guidelines**

These guidelines should be especially helpful to the coordinating/facilitator teams developing national C&I for SFM sets, including interested stakeholders, as well as those who will implement or use C&I for SFM. These include policy makers, administrative bodies, forest owners, forest industry, NGOs, researchers, international organizations and the broad public alike are interested in knowing about the state of forests and forestry.

C&I related information on sustainable forest management can serve as a sound basis for their assessment and decision-making as well as a transfer of forest-related knowledge.

## **1.4 Benefits and potential of a national set of C&I for SFM**

A national set of C&I for sustainable forest management should provide a basis for evidence-based policy and communication, which will assist in:

- monitoring, assessing and reporting the state of countries' forests;
- strengthening the development of national forest programmes and monitoring their implementation;
- providing incentives for practical sustainable forest management;
- encouraging dialogue between the forest and other sectors as well as with society; and
- demonstrating how forests benefit society.

## 1.5 Improving regional, international and national C&I sets

There has been good progress in implementing C&I over the last 25 years (Linser et al, 2018 a and b), but there is always scope for doing better:

- There is still no common agreed conceptual framework for C&I development which has caused variations in quality when developing C&I<sup>1</sup>.
- Broadening stakeholder engagement is challenging and takes considerable time when trying to achieve compromise between stakeholders with different interests but it is essential to the successful development of C&I.
- Integrating C&I with existing forest information systems, such as forest resource assessment, will improve the chances that they become of real practical value and will be fully implemented.
- The political will to support C&I implementation may need to be strengthened, where possible.
- Data availability/quality for socio-economic indicators have been improving but still do not quite match the standard of indicators on forest resources, forest health or forest biodiversity.
- C&I sometimes do not consider linkages, interdependencies, and causal chains among indicators, and don't always connect quantitative and qualitative indicators well.

## 1.6 Historical Background

Regional C&I for SFM processes were established at different times in the past, starting in 1991 and intensified after the United Nations Conference on Environment and Development. By 2000 there were 11 regional C&I for SFM processes ongoing with about 170 countries participating at various levels and ecosystems. Nowadays there are only six C&I for SFM processes which proactively coordinate and support their member countries (Linser et al., 2018a):

- The International Tropical Timber Organization's (ITTO) C&I for sustainable management of tropical forests (1986-ongoing)
- The Pan-European Forest Process on C&I for SFM (FOREST EUROPE) (1990-ongoing)
- The Montréal Process on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests (1993-ongoing)
- The Amazon Cooperation Treaty Organization (ACTO) Tarapoto/ITTO Process on C&I for the sustainability of Amazon forests (1995-ongoing)
- The Association of Southeast Asian Nations (ASEAN) C&I for the sustainable management of tropical forests in Southeast Asia (1998-ongoing)
- The Low-Forest-Cover-Countries Process (LFCC) (2000-ongoing).

The following C&I processes were initiated with support and facilitation of the FAO, in collaboration with partner institutions such as UN Environment, CIFOR, ITTO. They do not have typical process characteristics as such but are rather FAO coordinated country groups with irregular meetings.

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<sup>1</sup> In recognition of this, the project and initiative will develop/test a national process/conceptual framework in a learning by doing – action research way.

- Dry-Zone Africa Process on C&I for the sustainable management of dry-zone forests in sub-Saharan countries (1995-ongoing)
- The Near East and North Africa Process on C&I for sustainable management of dry-zone forests (NENA) (1996-ongoing)
- The Lepaterique Process of Central America on C&I for SFM (1997-ongoing)
- The Dry Forests in Asia Regional Initiative for the Development and Implementation of National-Level C&I for the Sustainable Management of Dry Forests in Asia (1998-ongoing)

The process of the African Timber Organization (ATO)/ITTO C&I for West and Central Africa (1994-2016) ceased its operations.

While some countries develop and implement criteria and indicators under one or even two processes (FIGURE 1), the degree of activity and/or involvement in the development and implementation of criteria and indicators may vary considerably between countries (Linser et al., 2018a).

Also, the processes differ in several attributes, such as the forest type for which they were developed (temperate, boreal, tropical, dry forests), the level at which they are applied (regional, international) and by the number of criteria and indicators to address SFM. However, they all reflect a holistic approach to forests as ecosystems with multiple values beyond wood production (ITTO, 2012).

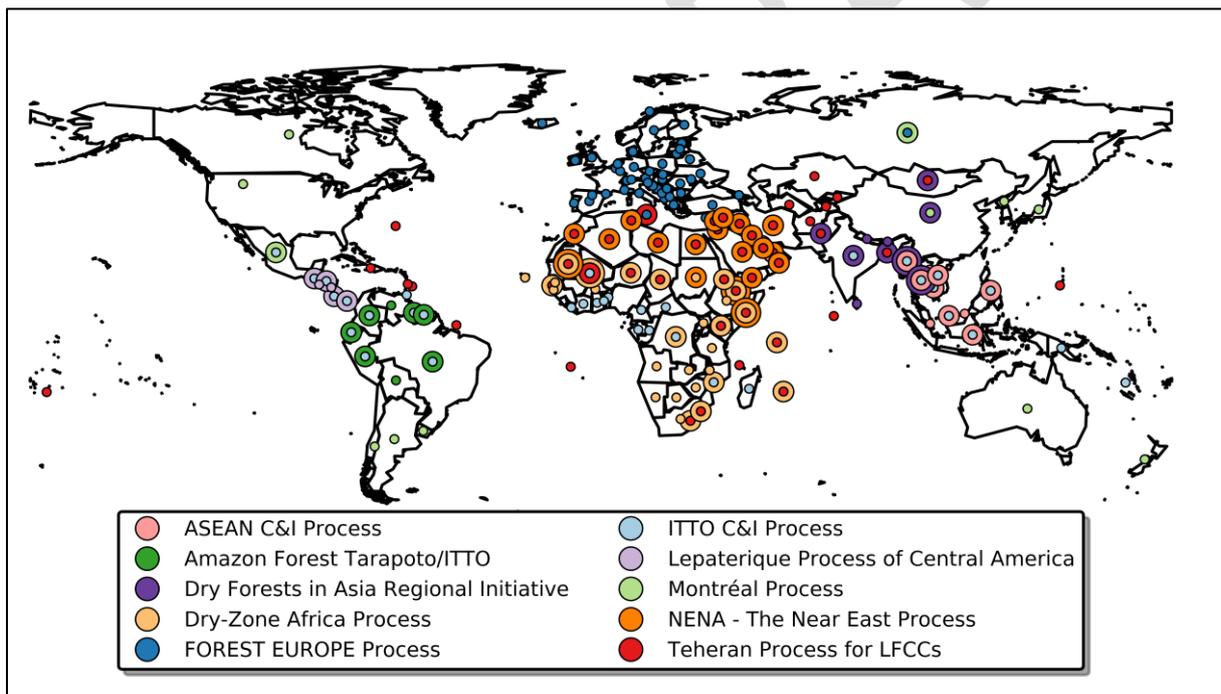


FIGURE 1: Distribution of the member countries or countries involved in all regional and international C&I for SFM processes.

Total of 171 countries. 52 countries participate in 2 processes. 6 countries participate in 3 processes. Armenia, Azerbaijan, Guinea, Nigeria, North Korea, Paraguay and Uzbekistan do not participate in any regional or international C&I for SFM process. ATO/ITTO is above included in ITTO. Source: Linser et al, 2018a.

Some examples of regional and international indicator sets are presented in chapter 5 as food for thought and inspiration for the development of national C&I for SFM sets in the project countries.

## 2 The What? Basics for the development of C&I

### 2.1 Comprehension of Sustainable Forest Management

Widely-used definitions:

*Sustainable management means the stewardship and use of forests and forest lands in such a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems (MCPFE, 1993).*

The United Nations describe SFM as: “[a] dynamic and evolving concept [that] aims to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations” (FAO, [www.fao.org/forestry/sfm/85084/en/](http://www.fao.org/forestry/sfm/85084/en/)).

The definitions make it clear that SFM will change over time but that its purpose is, at a minimum, to maintain all forest values in perpetuity. The following figure shows that SFM is a multidimensional concept because it incorporates the pillars of sustainable forest management: ecological sustainability, economic sustainability and socio-cultural sustainability which are based on longevity, social liability, efficient resource use and responsibility (figures 2 and 3).

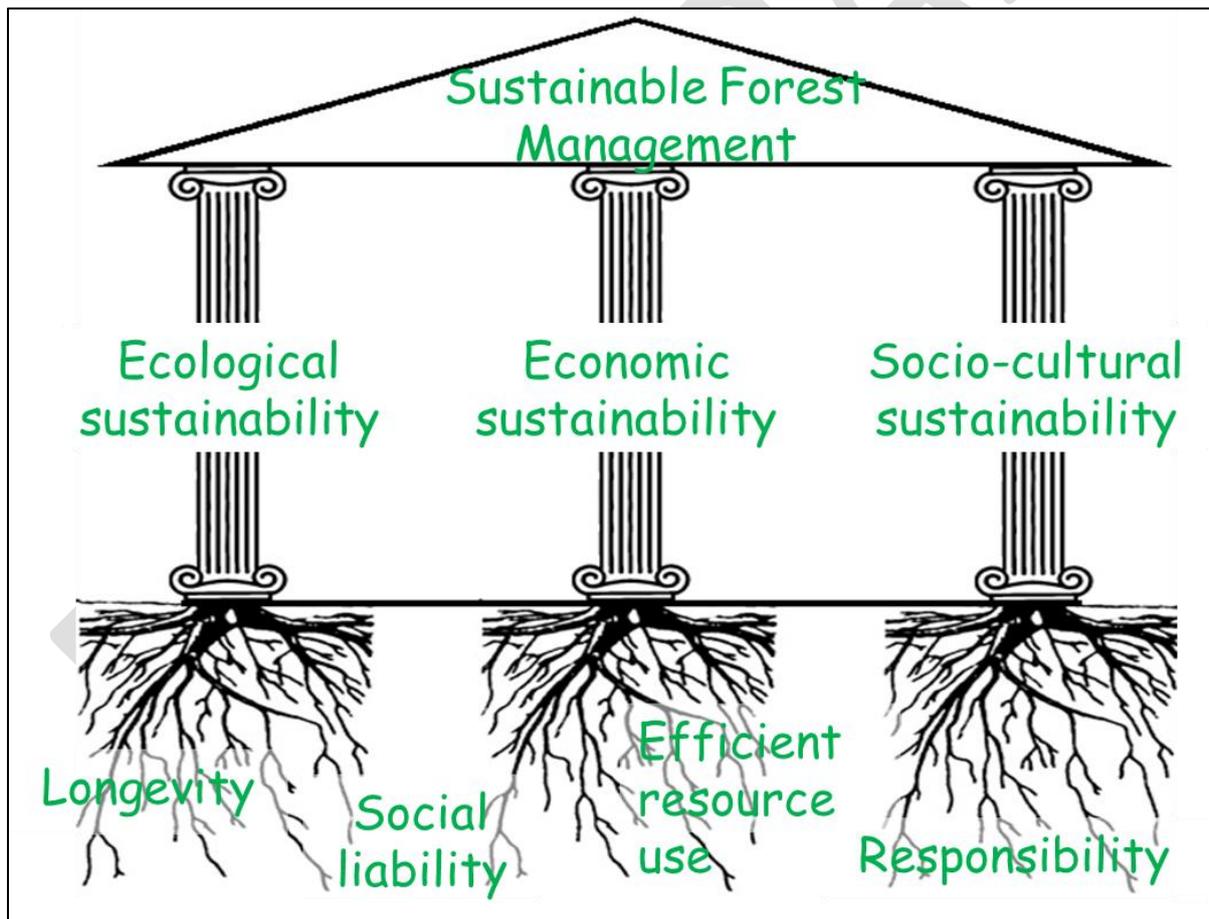


FIGURE 2: The three pillars of SFM. Source: Wolfslehner, 2007.

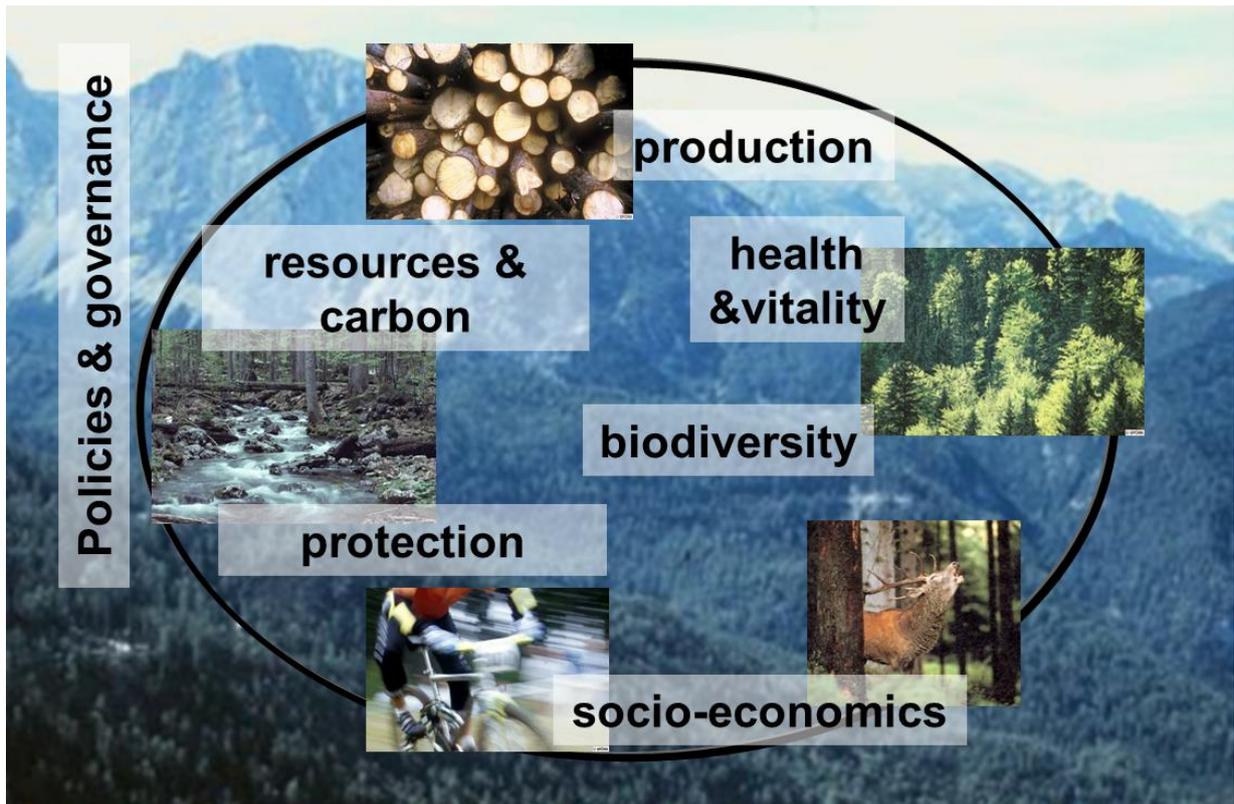


FIGURE 3: Essential elements of SFM. Source: Wolfslehner, 2007.

## 2.2 What are Criteria and Indicators?

C&I can be applied at various levels: global, regional, international, national, subnational or at the Forest Management Unit (FMU) level, while allowing for differences within and between countries, regions or particular locations.

C&I provide a commonly agreed framework for articulating and defining expectations (including targets), developing management methods, best practice and performance elements of SFM and are then used in monitoring and evaluating progress towards those expectations and targets. In the past 25 years, national-level C&I have evolved mostly as reporting and monitoring instruments, which are used increasingly for assessment of the sustainability of forest management.

C&Is are also increasingly used to guide forest sector reforms, by identifying targets required to release the full potential of sustainable forest management. They have helped broaden the scope of forest sector reforms to include social, economic, governance as well as ecological aspects.

Across local, national, regional and international levels, criteria are generally becoming more aligned with each other, but indicators' sets range from more generic at international and national level to more context-specific local level.

National C&Is should reflect a mix of technical aspects and stakeholder interests. They should take into consideration internationally-agreed criteria, but with context derived specificity from indicators based on specific national characteristics and priorities for SFM.

C&Is originate from being part of a logical hierarchy process (figure 4) where higher level goals are divided into key principles of SFM which are in turn divided into criteria each with a number of indicators. In the case of national C&I sets, the goal should be aligned with or derived from national visions or policy goals for SFM.

Although goals and principles are not commonly included in sets of C&I, there is merit in using this hierarchy to structure the process of developing C&I. According to Hunter, it is necessary to try to improve the hierarchical logical framework to increase the chance of including all relevant aspects of SFM in the set of C&I, for a number of reasons, to decrease the chance of including redundant indicators in the set, and to establish a clear and transparent logical relationship between the indicators to be measured and the principles to which they relate (Hunter, 1998).

In Annex 1, within the toolbox of methods to assist with the development of national C&I, there is a hierarchy process tool designed to help develop C&I in a coherent and logical way.

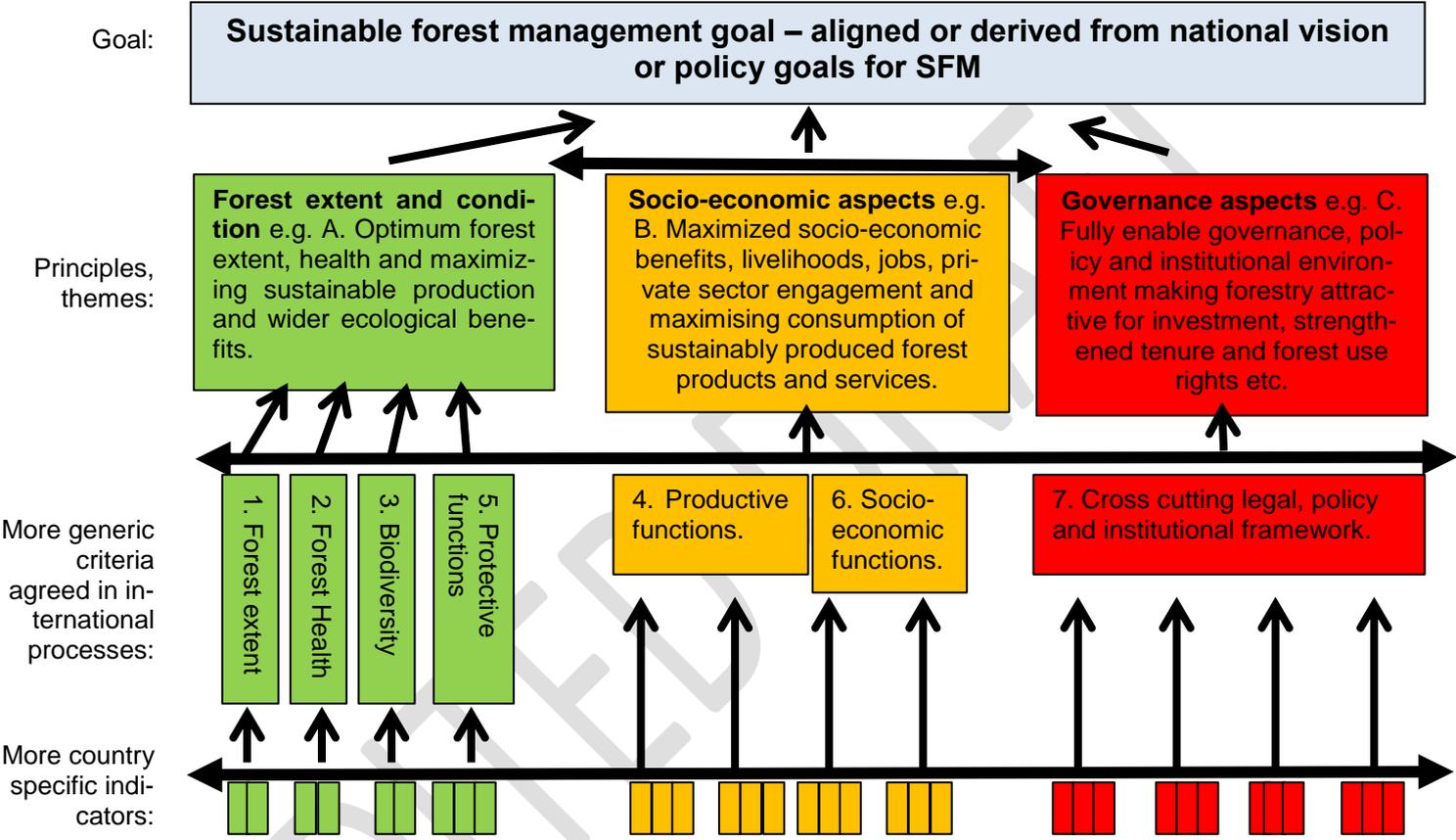


FIGURE 4: A summary of the hierarchical framework for the formulation of sustainable forest management standards Source: Lammerts van Bueren and Blom, 1997, p. 26, adapted by O'Hara.

**2.2.1 Criteria for sustainable forest management**

Criteria relate to WHAT is important to measure.

Widely used definitions:

*CRITERIA characterize or define the essential elements or set of conditions or processes by which sustainable forest management may be assessed (MCPFE, 1998).*

*CRITERIA define the essential elements against which sustainability is assessed, with due consideration paid to the productive, protective and social roles of forests and forest ecosystems. Each criterion relates to a key element of sustainability, and may be described by one or more indicators (FAO, 2015a).*

A *CRITERION* is defined as an aspect of forest management that is considered important and by which SFM may be assessed. A criterion accompanied by a set of related indicators describes a state or situation that should be met to comply with SFM (ITTO, 2016).

Thus, a criterion is a condition that should be met to confirm that forests are managed sustainably. This could be e.g. maintenance, enhancement, protection or conservation of the essential elements of SFM.

### **2.2.1.1 Examples of criteria for SFM of various regional C&I processes**

#### ***The six pan-European criteria for SFM (2015)***

- C 1: Maintenance and appropriate enhancement of forest resources and their contribution to global carbon cycles
- C 2: Maintenance of forest ecosystem health and vitality
- C 3: Maintenance of productive functions of forests (wood and non-wood)
- C 4: Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems
- C 5: Maintenance and appropriate enhancement of protective functions in forest management (notably soil and water)
- C 6: Maintenance of other socio-economic functions and conditions

#### ***The seven criteria of the Montréal Process (2015)***

- C 1: Conservation of biological diversity
- C 2: Maintenance of productive capacity of forest ecosystems
- C 3: Maintenance of forest ecosystem health and vitality
- C 4: Conservation and maintenance of soil and water resources
- C 5: Maintenance of forest contribution to global carbon cycles
- C 6: Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies
- C 7: Legal, institutional and economic framework for forest conservation and sustainable management

#### ***The seven criteria of ITTO (2016)***

- C 1: Enabling conditions for sustainable forest management
- C 2: Extent and condition of forests
- C 3: Forest ecosystem health and resilience
- C 4: Forest production
- C 5: Forest biological diversity
- C 6: Soil and water protection
- C 7: Economic, social and cultural aspects

### **The seven thematic elements of UNFF (2007)**

Based on the criteria listed above, which are well-known and applied in many countries, the United Nations Forum on Forests (UNFF) agreed in 2007 *seven thematic elements of SFM*.

#### **The seven thematic elements of SFM (UNFF, 2007)**

1. Extent of forest resources
2. Forest biological diversity
3. Forest health and vitality
4. Productive functions of forest resources
5. Protective functions of forest resources
6. Socio-economic functions
7. Legal, policy and institutional framework.

These thematic elements are used in this document to structure a shopping list of indicators (see Annex 2).

### **2.2.2 Indicators for sustainable forest management**

Indicators relate to HOW to measure SFM. They may be quantitative or qualitative.

#### Widely-used definitions:

*INDICATORS show changes over time for each criterion and demonstrate the progress made towards their specific objectives (MCPFE, 1998).*

*INDICATORS are parameters which can be measured and correspond to a particular criterion. They measure and help monitor the status and changes of forests in quantitative, qualitative and descriptive terms that reflect forest values as seen by those who defined each criterion (FAO, 2015a).*

*SUSTAINABILITY INDICATORS are science-based measures that provide a consistent approach to assess, monitor and report progress on SFM to a wide range of stakeholders and institutions, including governments, the private sector, non-governmental organizations, donor organizations, researchers and the public. Sustainability indicators can be useful to identify the changes in forest management practices required to maintain and improve healthy forests (FAO, 2015b).*

*AN INDICATOR is a quantitative, qualitative or descriptive attribute that, when measured and monitored periodically, indicates the direction of change in a criterion. Indicators identify the information needed for assessing and monitoring change, both in the forest itself (outcome indicators) and as part of the environmental and forest management systems used (input and process indicators). A time series of the values of any measurable or clearly descriptive indicator can provide information on the direction of change, either towards or away from SFM. The indicators cannot by themselves establish the sustainability of management, however (ITTO, 2016).*

Indicators are strong tools to collect and report information. Indicators can be based on different approaches:

- political
- scientific
- market-oriented

Indicators may have different purposes or uses:

- description and diagnosis

- communication
- forecasting and future trends
- collection of heterogeneous information and interests
- means of governance control
- check of effectiveness of policies and programmes

According to Ott, an index or indicator reduces a large quantity of data to its simplest form, retaining essential meaning for the questions that are being asked of the data. In short, an index or indicator is designed to simplify (Ott,1978). Thus, there is a graded information system (figure 5):

- Basic data: at the measurement place
- Processed information: statistically processed and harmonized data
- Indicator: one- or two-dimensional figure, like forest area per inhabitant
- Index: unit-less, weighted, multi-dimensional aggregation, like the ecological footprint or the index of well-being.

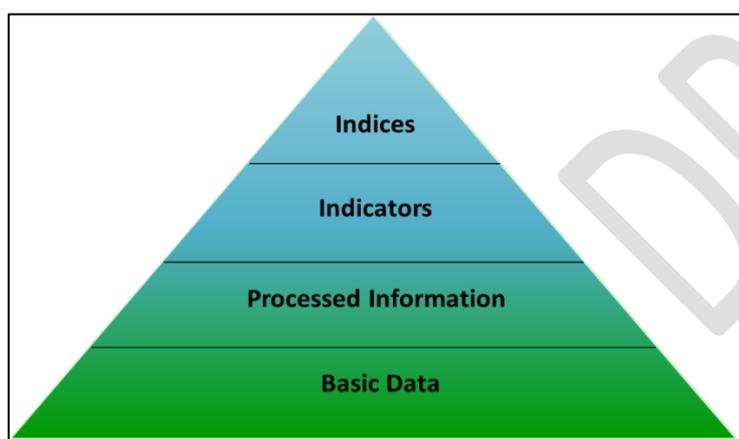


FIGURE 5: Data Pyramid. Source: Adrianse, 1995.

Keep in mind that indicators, respectively indicator sets, should be in a format that is designed with an explicit user group in mind. According to figure 6, there are three types of user groups, based on the quantity of information incorporated in the indicator set:

1. *Professional analysts and scientists* are most interested in raw, basic data, which can be analyzed statistically. They prefer many pieces of information per message conveyed but they also work with aggregated data. They prefer to draw their own conclusions based on available data.
2. *Policy makers* prefer data related to policy objectives, criteria, targets, and threshold degrees. The information should be condensed to a few information bits per message not to lose clarity. Often, they expect short multi-aspect analysis (pros and cons) to facilitate decision-making.
3. *The public* is very diverse and is assumed to prefer explicit, clear, and not too many messages in a single bit of information. In general, the public is not used to handling or understanding aggregated indicators. Usually, a simple one-side narrative (good or bad) accompanies this information.

Choose the format for each indicator set, that has appeal and meaning for that particular user group.

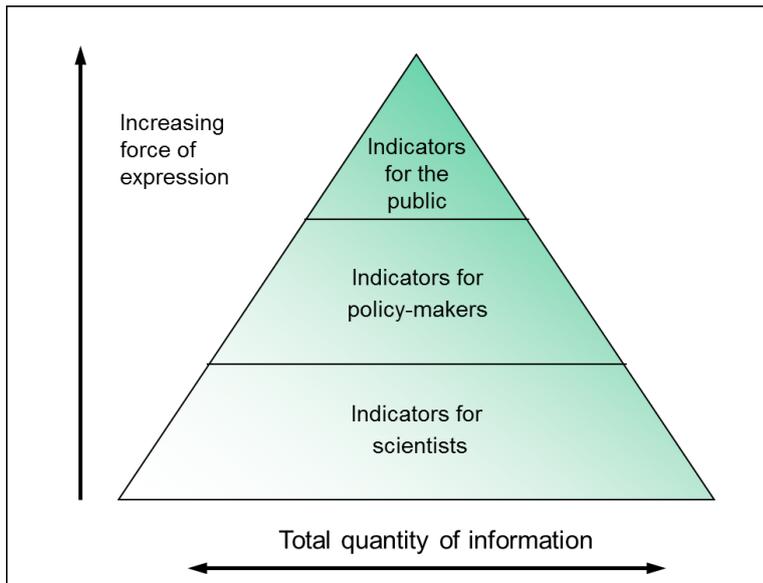


FIGURE 6: Relationship between indicators, data, force of expression and user groups (Linser, 2002).

### 2.2.2.1 Requirements for indicators

The principal requirements for SFM indicators are that (Linser, 2002):

- they should **display the expected use**.
- they need to be **practicable**, that means a concise set of about 30 indicators, not hundreds of indicators.
- they need to be **meaningful** and **communicative**, easily comprehensible, particularly by decision-makers.

If those requirements are achieved, there is also a need to comply with various requirements about the underlying data of SFM indicators:

- data should be presented in **time series** if available, as this enables the evaluation of the **trend** of that aspect towards sustainable management.
- data should be **sensitive** to human-induced positive or negative changes.
- data should have a **high validity** and **credibility**.
- data should be **measurable** and **feasible**.
- indicators should be **internationally comparable** and a reference for further action.

### **3 The Why? Demand for C&I for SFM in the Caucasus and Central Asia**

Countries in Central Asia and the Caucasus face serious challenges that have hampered proper reporting on the state of forests. Data are often not available, and measurement and collection of data are difficult and require capacity that is currently lacking. National policy and decision makers may not be fully aware of the significance of forests and the forest sector, nor of the importance of information for the effective implementation of SFM.

The five project countries range from 'low forest cover countries' (Kazakhstan, Kyrgyzstan, Uzbekistan) where forest and land degradation pose serious environmental challenges to countries with higher forest cover (Armenia, Georgia) where the potential of forests to provide social, environmental and economic benefits may not be fully realized. The following issues must be faced:

1. Challenges in national reporting: no forest inventories completed or recent reliable data available at national level;
2. No national criteria and indicators for sustainable forest management, or the current criteria and indicators are not up to date to respond to the needs for monitoring progress towards sustainable development goals and a green economy;
3. Illegal logging, forest degradation, land degradation and excessive grazing pose threats to the forests in the countries in the region, but tools to collect reliable information are not available, and the importance of monitoring not acknowledged;
4. Importance of the environmental, economic and social aspects of the forest sector is underestimated by policymakers due to the lack of information and tools to communicate (such as criteria and indicators);
5. Countries have not so far actively participated in international criteria and indicators processes (except Georgia). Therefore, they cannot benefit directly from the knowledge and tools developed by these processes;
6. Serious challenges in international reporting: no data or incomplete data provided to international reporting processes.

The project countries have had only limited participation in international forest reporting processes due to national reporting capacities. Monitoring tools, such as national criteria and indicators do not exist in most project countries, even though international SFM C&I systems have been established over 25 years. The target countries struggle to compete for resources with other large sectors such as agriculture, and the forest sector needs support to improve its visibility and to participate effectively in policy and legislative development.

## **4 The How? Development of national C&I for SFM**

### **4.1 Stakeholder engagement**

Many sectors and different stakeholders have an interest in forests. There is a wide range of actors with a broad interest in analyzing, defining, negotiating and agreeing on appropriate national C&I including rural people who use forest resources, governments, administrative bodies, the private sector, NGOs, international organizations and researchers.

A stakeholder mapping exercise will establish the most relevant stakeholders to engage in the process. Annex 1 describes a tool for conducting stakeholder mapping. Adopting a participatory approach to developing C&I for SFM will help to ensure that all stakeholder priorities on forests and forestry are considered in the resulting set of national C&I for SFM. Annex 1 provides a set of tools designed to offer options for stakeholder engagement in analysis, defining, negotiating and prioritizing national C&I.

This kind of multi-stakeholder process helps to generate mutual ownership of the end-products, builds trust between the various forestry stakeholder groups and the results serve as a basis for agreements, the evaluation of results, transparency and accountability. National C&I sets developed using a participatory approach are more relevant to national characteristics as stakeholder priorities are fully considered. They enhance ownership and awareness of C&I among the range of stakeholders, leading to more support for implementation.

This project should form the basis for subsequent participative events to revise and adapt C&I sets to reflect changing national and international conditions, emerging issues and new requirements.

### **4.2 The process of developing a nationally derived set of C&I for SFM**

There is no commonly agreed conceptual framework on how to develop national C&I. The focus should be to identify the smallest number of C&I needed to comprehensively and reliably monitor, report and assess forest management in a cost-effective manner.

An example of one approach to indicator selection follows (figure 7) (Linser, 2002, adapted):

1. Train the team to coordinate/facilitate the process of national C&I development on principles, process, methods and skills (This manual is designed to guide this training).
2. Review existing relevant national forest information and forest information systems.
3. Review relevant regional and international C&I processes and sets.
4. Undertake stakeholder mapping to identify relevant stakeholders to engage in the process (see appropriate tool in Annex 1).
5. Facilitate stakeholder engagement, analysis, multi-stakeholder negotiation and prioritisation of the key priority areas for national level C&I to focus on (see appropriate tool in Annex 1).
6. Conduct a logical hierarchy process from national goals down to C&I. Drawing upon and adapting indicators relevant to national priorities from regional and national C&I sets (cf. Annex 2: Shopping List of Indicators) and developing new indicators where gaps exist (see appropriate tool in Annex 1).
7. Evaluate the potential indicators against the requirements in chapter 2.2.2.1. Requirements for indicators: see appropriate tool in Annex 1.
8. Examine existing national data collection systems for appropriate data to support the construction of the candidate indicators. If the desired data are not available, examine feasibility of col-

lecting such data if the answer is positive, this should provide a new impulse for data acquisition.

9. Select indicators.

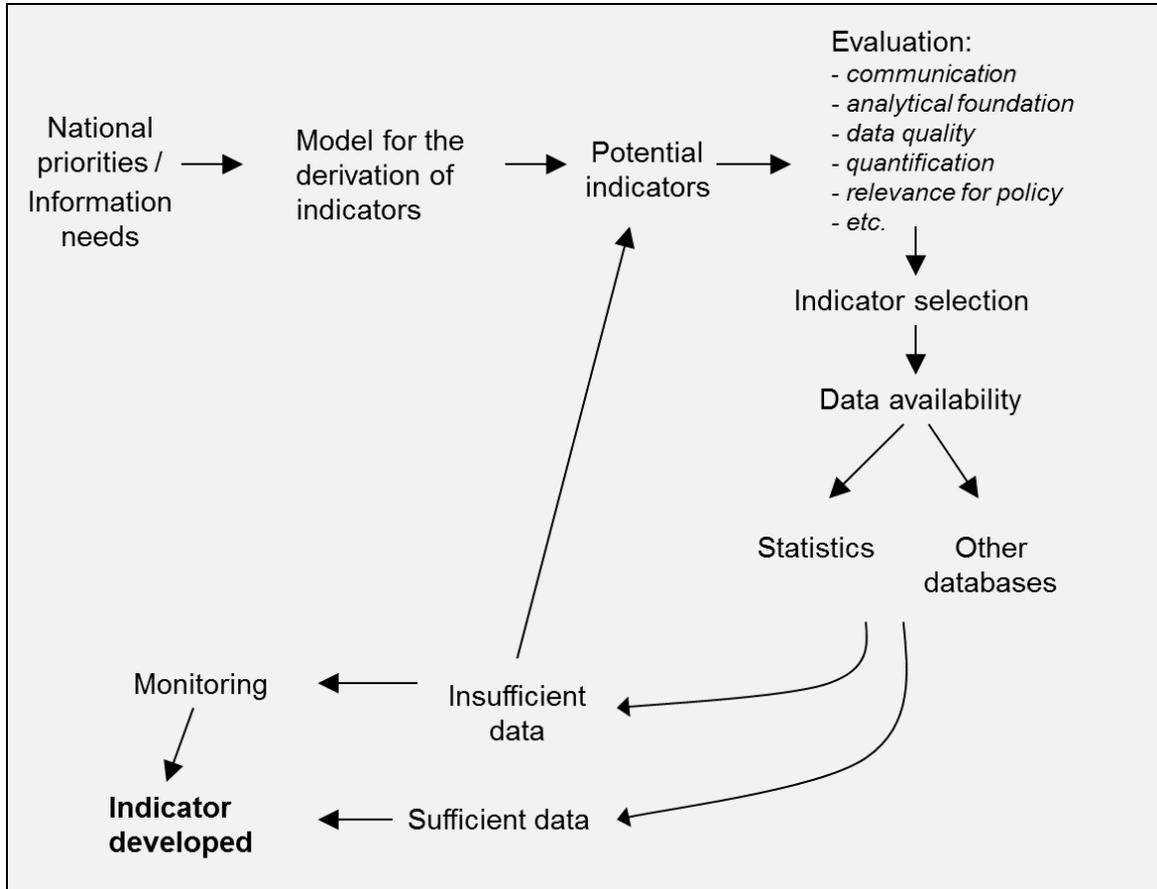


FIGURE 7: Process of national C&I indicator development, steps 6 to 9 (listed above) (Linser, 2002, adapted).

In practice, the national C&I process could be more complex and include a mixed bottom-up/top-down approach. The process and outcomes, particularly indicators, should be built strongly on national characteristics and priorities but aiming to align criteria with regional and international C&I sets, wherever possible. The process should be logical, clear, transparent, as inclusive as possible and combining technical aspects with stakeholder interests. An approach that has been used in this project is shown (figure 8).

This conceptual framework builds on three sources to develop a coherent and clear hierarchy of national priorities, criteria and indicators which are nationally relevant, compatible with international systems, user-friendly and feasible to implement:

1. A review of existing and past national forest information systems and experiences.
2. 'Bottom-up' stakeholder engagement within the country.
3. 'Top down' adaptation of international C&I sets to national context and alignment of national sets to international C&I sets.

The three inputs in figure 8 must be conducted in a parallel and interconnected way as they influence each other.

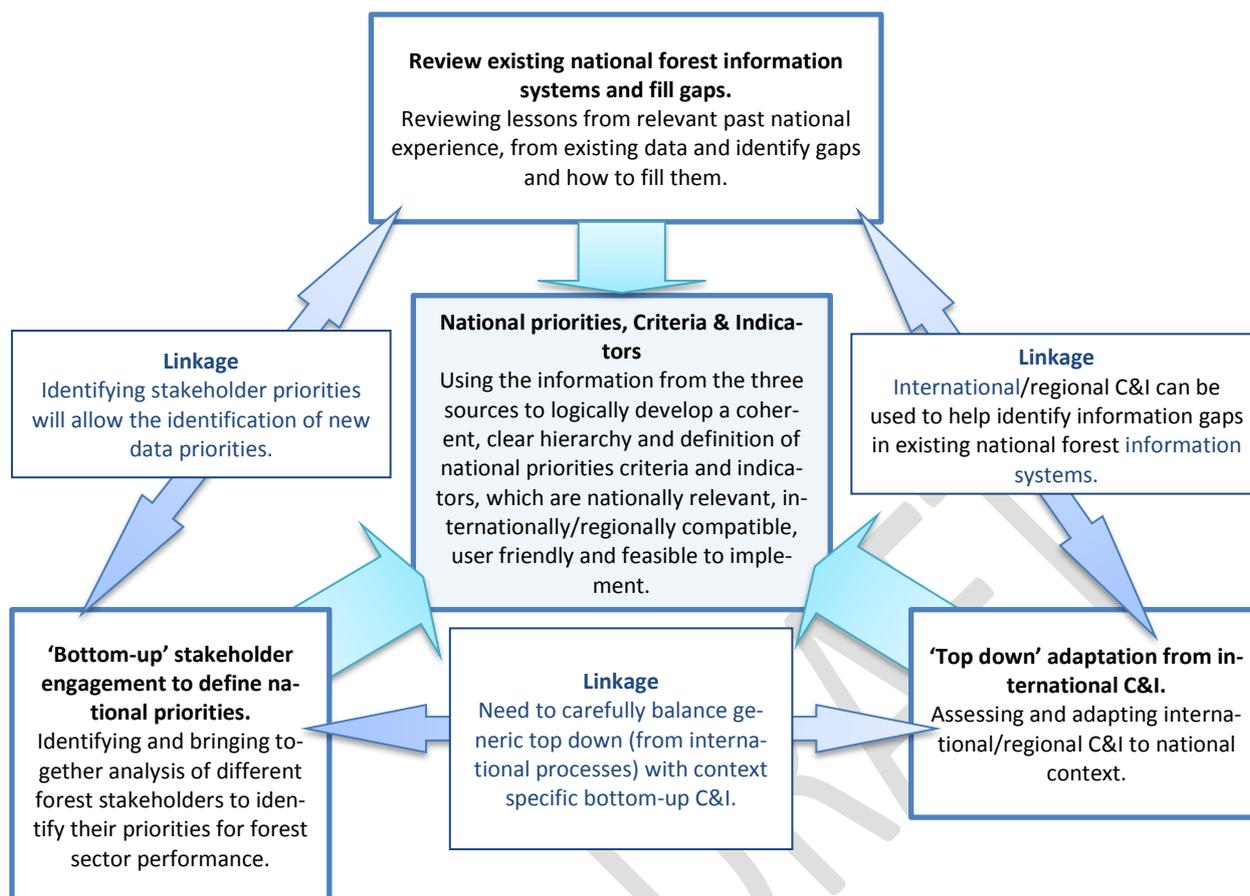


FIGURE 8: Conceptual framework for C&I development. Source: O'Hara, 2017.

### 4.3 Structure of the indicator fact sheet (See tool 11, Annex 1 for more details)

Developing an indicator fact sheet is a good way of thinking through the requirements for and building blocks of an effective indicator and its subsequent use.

Each indicator description should be structured according to the following headings which are described briefly below:

Qualitative/descriptive indicators (variables, which can only be described). They are especially about the overall policies, institutions and instruments for SFM in place):

- Indicator
- Rationale
- Descriptive questions
- Related definitions

Quantitative indicators (measurable variables, usually expressed by a numerical value):

- Indicator
- Rationale
- International data source
- Measurement units
- Current periodicity of data availability
- Reporting notes
- Related definitions

## **Indicator**

The name of the indicator is a shortened version of the full text of the indicator.

The full text of the indicators should not make reference to “change” (e.g. forest area instead of change in forest area). However, change which is derived from the comparison of data from two different points in time should always be considered, e.g. in the presentation of data time series.

## **Rationale**

Explain the rationale behind the indicator, its scope and limitations. It may also include an explanation of the desired direction of change, the utility of the information provided through the indicator, the range of views expressed, possible threshold issues and pitfalls in interpretation and limitations in force of expression, as well as major links to other indicators or criteria.

## **Data sources**

List the relevant main national and international data sources and providers. The ultimate source of data should be the national level (national statistics, national inventories and other national data providers).

## **Measurement units**

State the measurement units for the indicator for both status and changes, including an error estimate, if possible.

## **Current periodicity of data availability**

Give the current periodicity for available data.

The periodicity of reporting may differ between different figures or parameters within an indicator. Some information will usually be associated with periodic cycles of the national forest inventories (NFI). Countries with continuous NFI are capable of providing annual estimates.

## **Reporting notes**

Provide instructions on how to collect the respective data, which may not be obvious from the wording of the full text of the indicator. List the classification categories.

## **Targets and/or thresholds**

Describe agreed national or international targets and the timescales within which these are expected to be reached, expressed either as absolute values or the expected trend. Thresholds are scientific and/or official values, which should not be exceeded e.g. levels of CO<sub>2</sub> emissions.

## **Related definitions**

List the underlying terms and definitions related to the indicator in a glossary. Please see the example of the glossary in the [FAO FRA 2020](http://www.fao.org/3/I8661EN/i8661en.pdf)<sup>2</sup>, or the [FOREST EUROPE glossary](http://foresteurope.org/communication/#1473684927281-829b95cc-499686b5-6c62)<sup>3</sup>.

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<sup>2</sup> <http://www.fao.org/3/I8661EN/i8661en.pdf>

<sup>3</sup> <http://foresteurope.org/communication/#1473684927281-829b95cc-499686b5-6c62>

#### 4.3.1 Examples for indicator fact sheets:

Structure for **qualitative** indicators:

Criterion:	
Number of indicator:	Name of the indicator:
Rationale:	
Descriptive questions:	
Related definitions:	

Example of a qualitative (descriptive) indicator from FOREST EUROPE:

<b>CRITERION 4: MAINTENANCE, CONSERVATION AND APPROPRIATE ENHANCEMENT OF BIOLOGICAL DIVERSITY IN FOREST ECOSYSTEMS</b>	
<b>Indicator: C4.</b>	<b>Name of the indicator:</b> Policies, institutions and instruments to maintain, conserve and appropriately enhance the biological diversity in forest ecosystems
<p><b>Rationale:</b></p> <p>The policy dialogue related to the maintenance, conservation and appropriate enhancement of the biological diversity in forest ecosystem, is basic to implement and achieve the sustainable management of the forests and the forest sector.</p> <p>Forest management policies and practices in Europe promote biodiversity, notably through the use of natural regeneration and mixed-species stands, encouraging higher proportion of deadwood in forests, enhancing biological diversity in forest ecosystems, managing genetic resources, single stands, the landscape, and others. Information on policies, objectives, actions and measures taken related to forest biodiversity, is key for establishing a dialogue on forests, analyze the efficiency and effectiveness of the current policies and identifying gaps and updating needs to substantially contribute to forest biodiversity conservation and management at pan-European level.</p> <p>Policy framework, legislation/regulations, institutional capacity, economic and financial instruments and informative means, with associated policy actions/measures on biological diversity, trees species, regeneration, naturalness, introduced tree species, deadwood, genetic resources, threatened forest species, protected forests, including as appropriate considerations on policies and measures/actions taken on forest fragmentation/landscape pattern, both at national and sub-national levels, create an enabling environment for the sustainable management of the forests and the forest sector.</p>	
<p><b>Descriptive questions:</b></p> <p>Information, where appropriate, on main policy objectives, relevant institutions, main policy instruments (legal/regulatory, financial/economic, informational) and significant changes related to the maintenance, conservation and appropriate enhancement of the biological diversity in forest ecosystem.</p> <ul style="list-style-type: none"> <li>• Existence of forest policies and instruments, including specific policy objectives, related to the maintenance, conservation and appropriate enhancement of the biological diversity in forest ecosystem.</li> <li>• Existence and capacity of an institutional framework to maintain, conserve and appropriately enhance biological diversity at the forest ecosystems, manage species and genetic levels; have responsibilities related to protected areas, protect threatened species, ensure regeneration of managed forests, etc.</li> </ul>	

- Existence of a legal/regulatory framework for the management, conservation and sustainable development of forest; that provides national adherence to international legal instruments; provides legal instruments to protect representative, rare or vulnerable forest ecosystems, to protect threatened species; to ensure regeneration of managed forests, etc.
- Existence of economic and financial instruments to maintain, conserve and appropriately enhance biological diversity at the forest ecosystems.
- Existence of informational means to implement the policy framework.
- Related actions and measures taken to maintain, conserve and appropriate enhance the biological diversity in forest ecosystems, including considerations to forest fragmentation.

**Related definitions:**

Biological diversity; conservation of biodiversity; forest policy; protected forest; policies supporting sustainable forest management; institutional framework.

Structure for **quantitative** indicators:

Criterion:	
Number of indicator:	Short name of the indicator: Full text:
Rationale:	
Data sources:	
Measurement units:	
Current periodicity of data availability:	
Reporting notes:	
Targets and/or thresholds:	
Related definitions:	

Example of a quantitative indicator from FOREST EUROPE (modified with threshold information from the SEMAFOR project ([System for the Evaluation of the Management of Forests](#)<sup>4</sup>).

<b>CRITERION 1: MAINTENANCE AND APPROPRIATE ENHANCEMENT OF FOREST RESOURCES AND THEIR CONTRIBUTION TO GLOBAL CARBON CYCLES</b>	
<b>Indicator: 3.1</b>	<p><b>Short name of the indicator:</b> Increment and fellings</p> <p><b>Full text:</b> Balance between net annual increment and annual fellings of wood on forest available for wood supply</p>
<p><b>Rationale:</b></p> <p>This indicator highlights the sustainability of timber production over time as well as the current availability and the potential for future availability of timber. For long run sustainability, the annual fellings must not exceed the net annual increment.</p> <p>The net annual increment according to FRA 2015 is “average annual volume of gross increment over the given reference period less that of natural losses on all trees, measured to minimum diameters as defined for growing stock”. Gross increment includes the volume growth of survivor trees and the increment on trees which have been felled or die during the reference period.</p> <p>This indicator is mainly linked to indicators 2.1, 2.3 and 2.4.</p>	
<p><b>Data sources:</b></p> <ul style="list-style-type: none"> <li>- FOREST EUROPE/UNECE/FAO (for fellings)</li> <li>- Eurostat: JQ annual data (for removals)</li> </ul>	
<p><b>Measurement units:</b></p> <p>Status: m<sup>3</sup></p> <p>Changes: m<sup>3</sup>/yr</p>	
<p><b>Current periodicity of data availability:</b></p> <p>Usually associated with NFI, typically 10 years.</p>	
<p><b>Reporting notes:</b></p> <p><i>Separate figures to be reported on:</i></p> <ul style="list-style-type: none"> <li>- Net annual increment of wood on forest available for wood supply</li> <li>- Annual fellings of wood on forest available for wood supply</li> <li>- Net annual increment of wood on total forest area</li> <li>- Annual fellings of wood on total forest area</li> </ul>	
<p><b>Targets and/or thresholds:</b></p> <p>Threshold: Ratio fellings/net annual increment on forest available for wood supply, in most recent ten-year period exceeds 100%.</p>	
<p><b>Related definitions:</b></p> <p>Forest; forest available for wood supply; growing stock; gross annual increment; net annual increment; natural losses; fellings.</p>	

<sup>4</sup> <https://www.unece.org/fileadmin/DAM/timber/meetings/20160323/Wed/2016-jwpcfsem-item5-1-3-semafor.pdf>

## 5 Examples of regional and international C&I sets

The criteria and indicators listed in the following regional C&I sets are to give food for thought and inspiration when working up national criteria and indicators. Other C&I might also be appropriate for the national set to reflect national characteristics and country specific priorities.

### 5.1 The FOREST EUROPE C&I

The pan-European set of C&I for SFM of the FOREST EUROPE Process (2015) contains 6 criteria and 45 indicators. The first five indicators are not assigned to a particular criterion but address the overarching policy framework of the set and are qualitative/descriptive in nature.

	No.	Indicator
Forest policy and governance	1	National Forest Programmes or equivalent
	2	Institutional frameworks
	3	Legal/regulatory framework: National (and/or sub-national) and International commitments
	4	Financial and economic instruments
	5	Information and communication

Criteria	No.	Indicator	Full text
Criterion 1: Maintenance and Appropriate Enhancement of Forest Resources and their Contribution to Global Carbon Cycles	C.1	Policies, institutions and instruments to maintain and appropriately enhance forest resources and their contribution to global carbon cycles	
	1.1	Forest area	Area of forest and other wooded land, classified by forest type and by availability for wood supply, and share of forest and other wooded land in total land area
	1.2	Growing stock	Growing stock on forest and other wooded land, classified by forest type and availability for wood supply
	1.3	Age structure and/or diameter distribution	Age structure and/or diameter distribution of forest and other wooded land, classified by availability for wood supply
	1.4	Forest carbon	Carbon stock and carbon stock changes in forest biomass, forest soils and in harvested wood products
Criterion 2: Maintenance of Forest Ecosystem Health and Vitality	C.2	Policies, institutions and instruments to maintain forest ecosystem health and vitality	
	2.1	Deposition and concentration of air pollutants	Deposition and concentration of air pollutants on forest and other wooded land
	2.2	Soil condition	Chemical soil properties (pH, CEC, C/N, organic C, base saturation) on forest and other wooded land related to soil acidity and eutrophication, classified by main soil types
	2.3	Defoliation	Defoliation of one or more main tree species on forest and other wooded land in each of the defoliation classes
	2.4	Forest damage	Forest and other wooded land with damage, classified by primary damaging agent (abiotic, biotic and human induced)
	2.5	Forest land degradation	Trends in forest land degradation

Criteria	No.	Indicator	Full text
Criterion 3: Maintenance and Encouragement of Productive Functions of Forests (Wood and Non-Wood)	C.3	Policies, institutions and instruments to maintain and encourage the productive functions of forests	
	3.1	Increment and fellings	Balance between net annual increment and annual fellings of wood on forest available for wood supply
	3.2	Roundwood	Quantity and market value of roundwood
	3.3	Non-wood goods	Quantity and market value of non-wood goods from forest and other wooded land
	3.4	Services	Value of marketed services on forest and other wooded land
Criterion 4: Maintenance, Conservation and Appropriate Enhancement of Biological Diversity in Forest Ecosystems	C.4	Policies, institutions and instruments to maintain, conserve and appropriately enhance the biological diversity in forest ecosystem	
	4.1	Diversity of tree species	Area of forest and other wooded land, classified by number of tree species occurring
	4.2	Regeneration	Total forest area by stand origin and area of annual forest regeneration and expansion
	4.3	Naturalness	Area of forest and other wooded land by class of naturalness
	4.4	Introduced tree species	Area of forest and other wooded land dominated by introduced tree species
	4.5	Deadwood	Volume of standing deadwood and of lying deadwood on forest and other wooded land
	4.6	Genetic resources	Area managed for conservation and utilisation of forest tree genetic resources (in situ and ex situ genetic conservation) and area managed for seed production
	4.7	Forest fragmentation	Area of continuous forest and of patches of forest separated by non-forest lands
	4.8	Threatened forest species	Number of threatened forest species, classified according to IUCN Red List categories in relation to total number of forest species
	4.9	Protected forests	Area of forest and other wooded land protected to conserve biodiversity, landscapes and specific natural elements, according to MCPFE categories
Criterion 5: Maintenance and Appropriate Enhancement of Protective Functions in Forest Management	C.5	Policies, institutions and instruments to maintain and appropriately enhance of the protective functions in forest management	
	5.1	Protective forests – soil, water and other ecosystem functions - infrastructure and managed natural resources	Area of forest and other wooded land designated to prevent soil erosion, preserve water resources, maintain other protective functions, protect infrastructure and managed natural resources against natural hazards
Criterion 6: Maintenance of	C.6	Policies, institutions and instruments to maintain other socio-economic functions and conditions	

Criteria	No.	Indicator	Full text
other socio-economic functions and conditions	6.1	Forest holdings	Number of forest holdings, classified by ownership categories and size classes
	6.2	Contribution of forest sector to GDP	Contribution of forestry and manufacturing of wood and paper products to gross domestic product
	6.3	Net revenue	Net revenue of forest enterprises
	6.4	Investments in forests and forestry	Total public and private investments in forests and forestry
	6.5	Forest sector workforce	Number of persons employed and labour input in the forest sector, classified by gender and age group, education and job characteristics
	6.6	Occupational safety and health	Frequency of occupational accidents and occupational diseases in forestry
	6.7	Wood consumption	Consumption per head of wood and products derived from wood
	6.8	Trade in wood	Imports and exports of wood and products derived from wood
	6.9	Wood energy	Share of wood energy in total primary energy supply, classified by origin of wood
	6.10	Recreation in forests	The use of forests and other wooded land for recreation in terms of right of access, provision of facilities and intensity of use
$\Sigma$ = 34 quantitative indicators + 11 qualitative indicators (total 45 indicators)			

## 5.2 The Montréal Process C&I

The Montréal Process set of C&I for the Conservation and Sustainable Management of Temperate and Boreal Forests (Fourth Edition, 2015) contains 7 criteria and 54 indicators ([https://www.monrealprocess.org/Resources/Criteria\\_and\\_Indicators/index.shtml](https://www.monrealprocess.org/Resources/Criteria_and_Indicators/index.shtml)).

### Criterion 1: Conservation of Biological Diversity

#### 1.1. Ecosystem Diversity

1.1.a. Area and percent of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure

1.1.b. Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage

1.1.c. Fragmentation of forests

#### 1.2. Species Diversity

1.2.a. Number of native forest-associated species

1.2.b. Number and status of native forest-associated species at risk, as determined by legislation or scientific assessment

1.2.c. Status of on site and off-site efforts focused on conservation of species diversity

#### 1.3. Genetic Diversity

1.3.a. Number and geographic distribution of forest-associated species at risk of losing genetic variation and locally adapted genotypes

1.3.b. Population levels of selected representative forest-associated species to describe genetic diversity

1.3.c. Status of on site and off-site efforts focused on conservation of genetic diversity

### Criterion 2: Maintenance of Productive Capacity of Forest Ecosystems

- 2.a. Area and percent of forest land and net area of forest land available for wood production
- 2.b. Total growing stock and annual increment of both merchantable and non-merchantable tree species in forests available
- 2.c. Area, percent, and growing stock of plantations of native and exotic species
- 2.d. Annual harvest of wood products by volume and as a percentage of net growth or sustained yield
- 2.e. Annual harvest of non-wood forest products

**Criterion 3: Maintenance of Forest Ecosystem Health and Vitality**

- 3.a. Area and percent of forests affected by biotic processes and agents (e.g., disease, insects, invasive alien species) beyond reference conditions.
- 3.b. Area and percent of forest affected by abiotic agents (e.g., fire, storm, land clearance) beyond reference conditions

**Criterion 4: Conservation and Maintenance of Soil and Water Resources**

**4.1. Protective Function**

- 4.1.a. Area and percent of forest whose designation or land management focus is the protection of soil or water resources

**4.2. Soil**

- 4.2.a. Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources
- 4.2.b. Area and percent of forest land with significant soil degradation

**4.3. Water**

- 4.3.a. Proportion of forest management activities that meet best management practices, or other relevant legislation, to protect water related resources
- 4.3.b. Area and percent of water bodies, or stream length, in forest areas with significant change in physical, chemical, or biological properties from reference conditions

**Criterion 5: Maintenance of Forest Contribution to Global Carbon Cycles**

- 5.a. Total forest ecosystem carbon pools and fluxes
- 5.b. Total forest product carbon pools and fluxes
- 5.c. Avoided fossil fuel carbon emissions by using forest biomass for energy

**Criterion 6: Maintenance and Enhancement of Long-term Multiple Socio-economic Benefits**

**6.1. Production and Consumption**

- 6.1.a. Value and volume of wood and wood products production, including primary and secondary processing
- 6.1.b. Value of non-wood forest products produced or collected
- 6.1.c. Revenue from forest-based ecosystem services
- 6.1.d. Total and per capita consumption of wood and wood products in round wood equivalents
- 6.1.e. Total and per capita consumption of non-wood forest products
- 6.1.f. Value and volume in round wood equivalents of exports and imports of wood products
- 6.1.g. Value of exports and imports of non-wood forest products
- 6.1.h. Exports as a share of wood and wood products production, and imports as a share of wood and wood products consumption
- 6.1.i. Recovery or recycling of forest products as a percent of total forest products consumption

**6.2. Investment in the Forest Sector**

- 6.2.a. Value of capital investment and annual expenditure in forest management, wood and non-wood forest product industries, forest-based environmental services, recreation, and tourism
- 6.2.b. Annual investment and expenditure in forest-related research, extension and development, and education

**6.3. Employment and Community Needs**

- 6.3.a. Employment in the forest sector
- 6.3.b. Average wage rates, annual average income and annual injury rates in major forest employment categories
- 6.3.c. Resilience of forest-dependent communities
- 6.3.d. Area and percent of forests used for subsistence purposes
- 6.3.e. Distribution of revenues derived from forest management

**6.4. Recreation and Tourism**

- 6.4.a. Area and percent of forests available and/or managed for public recreation and tourism
- 6.4.b. Number, type, and geographic distribution of visits attributed to recreation and tourism and related to facilities available

**6.5. Cultural, Social, and Spiritual Needs and Values**

- 6.5.a. Area and percent of forests managed primarily to protect the range of cultural, social, and spiritual needs and values
- 6.5.b. The importance of forests to people

**Criterion 7: Legal, Institutional, and Economic Framework for Forest Conservation and Sustainable Management**

- 7.1.a. Legislation and policies supporting the sustainable management of forests
- 7.1.b. Cross sectoral policy and programme coordination
- 7.2.a. Taxation and other economic strategies that affect sustainable management of forests
- 7.3.a. Clarity and security of land and resource tenure and property rights
- 7.3.b. Enforcement of laws related to forests
- 7.4.a. Programmes, services and other resources supporting the sustainable management of forests
- 7.4.b. Development and application of research and technologies for the sustainable management of forests
- 7.5.a. Partnerships to promote the sustainable management of forests
- 7.5.b. Public participation and conflict resolution in forest-related decision making
- 7.5.c. Monitoring, assessment, and reporting on progress towards sustainable management of forests

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### 5.3 C&I for SFM in Low-Forest-Cover-Countries (LFCC)

The recommended set of LFCC C&I for SFM (Jafari, 2011) contains 7 criteria and 93 indicators.

Criteria	Elements	Indicators
<b>Criterion 1:</b> Biological Diversity	<b>Element 1-1:</b> Ecosystem Diversity	1-1-1- Forest area, age class in ecozone
		1-1-2- Forest area, age class all types of soil and protected zone from geomorphology point of view
		1-1-3- Forest type fragmentation
		1-1-4- Forest ecosystem degradation
		1-1-5- Area of protected forest ecosystem
	<b>Element 1-2:</b> Species Diversity	1-2-1- Endanger species in forest
		1-2-2- Population of species in a selected forest
		1-2-3- Species distributions
		1-2-4- Endemic and invader species
		1-2-5- Suitable habitat for wildlife with economic value
		1-2-6- Natural regeneration of species
	<b>Element 1-3:</b> Genetic Diversity	1-3-1- Genetic diversity in seed reforestation
		1-3-2- <i>in situ</i> and <i>ex situ</i> conservation of endangered species and species with economic value in each ecozone
1-3-3- Population of main and key species		
<b>Criterion 2:</b> Ecosystem condition and its Production		2-1- (Forest production), total tree growth, economic and non-trade value trees
		2-2- Increase or decrease of forest area, with the reason
		2-3- Forest area damaged by: forest fire, insects, pests, disease, wood harvesting (forest health and vigour)
		2-4- Forest area damaged by: drought, acid wash and ozone impact
		2-5- Forest area which regenerate successfully after harvesting
		2-6- Mean annual increments (growth) based upon forest type and age class
		2-7- Percentage of crown cover
		2-8- Percentage of biomass as volume (general type of forest)
		2-9- Forest protected zones
		2-10- Forestry project and percentage of coverage areas
		2-11- Forestry research project
		2-12- Rehabilitation of arid and semi-arid zone
		2-13- Afforestation
		2-14- Forest parks
<b>Criterion 3:</b> Soil and Water		3-1- Local acceptance (follow up) of standard law in relation to the soil erosion
		3-2- Local acceptance of soil erosion in relation to the road construction or river sinuosity
		3-3- Area of watershed damaged (degraded) by land use change in last 20 years
		3-4- Ground water level in forests

<b>Criterion 4:</b> Forest Role in Global Ecologic Cycle	<b>Element 4-1:</b> Carbon Cycle	4-1-1- Changes of net carbon in forest ecosystem
		4-1-2- Carbon storage in forest ecosystems, according to forest type and age class
		4-1-3- Net change in forest carbon production
		4-1-4- Carbon emission in forest sector
		4-1-5- Net carbon destruction
	<b>Element 4-2:</b> Climate Change	4-2-1- Partnership in Climate Change Convention and other related issues in forest sector
<b>Criterion 5:</b> Social and Economic benefits	<b>Element 5-1:</b> Economic benefits	5-1-1- Share of wood production in GDP
		5-1-2- Value of secondary products from harvested wood product
		5-1-3- Production, Consumption, Import and export of wood products
		5-1-4- Share of non-wood products in GDP
		5-1-5- Value of non-wood products (non-trading)
		5-1-6- Production, Consumption, Import and export of non-wood products
		5-1-7- Share of forest related services in GDP
		5-1-8- Value of forest related services (non-trading)
		5-1-9- Percentage of energy usage of renewable forest resources, compare to total energy use
		5-1-10- Investment volume in forest growth, health, management, planted forest, wood processing and tourism
	<b>Element 5-2:</b> Benefit sharing	5-2-1- Forest areas and time of wood production
		5-2-2- Distribution of financial benefits of industries wood production
		5-2-3- Concessions for local people
	<b>Element 5-3:</b> Sustainability of benefits	5-3-1- Annual wood production based on a sustainable harvest
		5-3-2- Annual non-wood production based on a sustainable harvest
		5-3-3- Return of capital
		5-3-4- Productivity Index
		5-3-5- Employments
		5-3-6- Average income of main (jobs) working groups
		5-3-7- Area of forest protected for water harvesting
	<b>Element 5-4:</b> International partnerships	5-4-1- Investment in international forest sector
		5-4-2- Cooperation with other countries in forest monitoring (data collecting) and reporting on C&I for SFM
	<b>Criterion 6:</b> Social responsibility	<b>Element 6-1:</b> Expected programmes for local people rights
6-1-2- Protect local people's rights in legal agreements, commitment and programme processing in SFM		
6-1-3- Forest area under local people management		
<b>Element 6-2:</b> Traditional land use and local forest-related ecologic knowledge		6-2-1- Number of studies on traditional land use which employed in forest management
		6-2-2- Local people's income based upon traditional knowledge
<b>Element 6-3:</b> Comfort and satisfaction of forest related communities		6-3-1- Economical diversity in forest related communities
		6-3-2- Educational and training gained by forest related communities
		6-3-3- Employment rate in forest related communities
		6-3-4- Number of low income people in forest related communities

	<b>Element 6-4:</b> Effective and suitable decision making	6-4-1- Stakeholder participation in SFM process
		6-4-2- Acceptance (follow up) of law, regulation and management rules in relation to SFM
		6-4-3- Percentage of forest area designed (programmed), managed and implemented by people participation
	<b>Element 6-5:</b> Information for decision making	6-5-1- Level of confidence regarding the collected forest-related data (coverage, reliability, replicability)
		6-5-2- Availability of forest-related data
		6-5-3- Investment in R&D and forest education and industrial wood production
		6-5-4- Number of new and updated standards and guidelines of forest management with regard to the ecologic targets
		6-5-5- Extension and usage of improved new technology
		6-5-6- Technology and new capacity to evaluate social-economic consequences of implementation of new technologies
	<b>Element 6-6:</b> Recreation facilities	6-6-1- Availability and usage of recreation facilities
		6-6-2- Variable usage of forest in social level
		6-6-3- Area and percentage of forest which has been managed for public recreation and tourisms
		6-6-4- Number and type of facility in relation to the forest area and population which has been managed for public recreation and tourisms
		6-6-5- Number of visitors in relation to the forest area and population to the areas which has been managed for public recreation and tourisms
		6-6-6- Number and possibility of fishing and game
<b>Criterion 7:</b> Legal and institutional condition	7-1- Availabilities of policies, laws and suitable regulations in national and regional level	
	7-2- Implementing laws in different levels and possibility of evaluation	
	7-3- Availability of suitable institutions and instruments	
	7-4- Economic and financial framework and instruments	
	7-5- Social informative and advisory instruments	
	7-6- Research and extension capacities	
	7-7- Use of traditional experience, knowledge and technologies	
	7-8- Transfer and use of suitable (environmentally-sound) technologies	
	7-9- Capabilities of implementing relevant international laws	
<b>Σ= 7 Criteria</b>	<b>15 Elements</b>	<b>93 Indicators</b>

## 5.4 ITTO C&I for the sustainable management of tropical forests

The ITTO C&I for the sustainable management of tropical forests (2016) comprise seven criteria, 18 indicator groups that subdivide the criteria, and 58 indicators.

### **Criterion 1: Enabling conditions for sustainable forest management**

#### ***Policy, legal and governance framework***

- 1.1 Policies, laws and regulations for governing forests
- 1.2 Forest tenure and ownership
- 1.3 Forest governance

#### ***Institutional framework***

- 1.4 Institutions responsible for, and supportive of, forest management
- 1.5 Availability of professional and technical personnel to perform and support forest management

#### ***Planning and monitoring framework***

- 1.6 Integration of forests in national and subnational land-use planning
- 1.7 Capacity and mechanisms for management planning & the periodic monitoring of implementation
- 1.8 Long-term projections, strategies and plans for production PFE and protection PFE
- 1.9 Stakeholder participation in land-use & forest management planning, monitoring and assessment

#### ***Economic framework***

- 1.10 National, subnational and international public and private funding committed to SFM
- 1.11 Incentives to encourage SFM

### **Criterion 2: Extent and condition of forests**

- 2.1 Extent and percentage of total land area under comprehensive land-use plans
- 2.2 Extent of forests committed to production and protection
- 2.3 Extent and percentage of total land area under each forest type
- 2.4 Multiyear forest management plans in FMUs
- 2.5 Forest area in compliance schemes
- 2.6 Change in forested area
- 2.7 Forest condition
- 2.8 Forest carbon stock

### **Criterion 3: Forest ecosystem health and resilience**

#### ***Addressing threats to, and vulnerabilities of, forests***

- 3.1 Threats to forests caused directly by human activities
- 3.2 Vulnerability of forests to natural disturbances
- 3.3 Forest resilience and climate-change adaptation

#### ***Restoration of degraded forests and lands***

- 3.4 Degraded forests and landscapes restored
- 3.5 Area of formerly degraded forest or forest land restored

### **Criterion 4: Forest production**

#### ***Resource assessment***

- 4.1 Natural production forest inventories, by product
- 4.2 Actual and allowable harvest of wood and non-wood products in natural forests
- 4.3 Actual harvest of wood and non-wood products in planted forests
- 4.4 Forest carbon stock

#### ***Harvesting planning and control procedures***

- 4.5 Timber harvesting arrangements in natural production forests

- 4.6 Forest product tracking systems or similar control mechanisms
- 4.7 Historical records on the extent, nature and management of forests

***Silviculture in natural and planted forests***

- 4.8 Reduced impact harvesting and silvicultural operations
- 4.9 Silvicultural management in planted forests
- 4.10 Strategic monitoring of silvicultural systems in natural and planted forests

**Criterion 5: Forest biological diversity**

***Ecosystem diversity***

- 5.1 Forest extent in protected areas
- 5.2 Buffer zone management and connectivity of protected forest areas

***Species diversity***

- 5.3 Threatened forest-dependent species
- 5.4 Procedures for conserving tree species diversity in natural tropical forests

***Genetic diversity***

- 5.5 *In situ* conservation of genetic variation within specified forest tree species

***Biodiversity conservation in production forests***

- 5.6 Biodiversity conservation measures in natural production forests
- 5.7 Biodiversity conservation in planted forests

**Criterion 6: Soil and water protection**

***Extent of protection***

- 6.1 Forest area managed primarily for the protection of soil and water
- 6.2 Protection of downstream catchment values at the landscape level

***Protective functions in production forests***

- 6.3 Soil productivity and water retention capacity in production forests
- 6.4 Area of production PFE considered environmentally sensitive and protected
- 6.5 Forest engineering for soil and water protection

**Criterion 7: Economic, social and cultural aspects**

***Economic aspects***

- 7.1 Contribution of the forest sector to gross domestic product
- 7.2 Value of domestically produced forest products and environmental services
- 7.3 Wood and non-wood forest product processing capacities and efficiency

***Social and cultural aspects***

- 7.4 Capacity building of the workforce in forest management and forest industry
- 7.5 Procedures to ensure the health and safety of forest workers
- 7.6 Mechanisms for the equitable sharing of the costs and benefits of forest management
- 7.7 Mechanisms for resolving disputes between forest stakeholders
- 7.8 Local livelihoods and forest management
- 7.9 Forests reserved for specific cultural, research or educational purposes

***Community and indigenous peoples' rights and participation in forest management***

- 7.10 Tenure and user rights of indigenous peoples & local communities over publicly owned forests
- 7.11 Involvement of indigenous peoples and local communities in forest management
- 7.12 Recognition and value of forest-management knowledge and skills of local people

## 5.5 Global Forest Resources Assessment 2015

The Global Forest Resources Assessment 2015 (FRA 2015) contains 7 themes, 20 thematic questions and 46 indicators (<http://www.fao.org/3/a-i4808e.pdf>).

### **Forest area and forest characteristics**

*Question 1:* What is the area of forest and other wooded land and how has it changed over time?

- Forest and other wooded land 2015
- Extent of forest 1990-2015
- Other wooded land 1990-2015
- Forest expansion 1990–2010
- Deforestation 1990–2010
- Reforestation 1990–2010

*Question 2:* What is the area of natural and planted forest and how has it changed over time?

- Forest characteristics 2015
- Primary forest 1990-2015
- Other naturally regenerated forest 1990-2015
- Planted forest 1990-2015
- Other naturally regenerated and planted forest 2015
- Mangroves 1990–2015

### **Production**

*Question 3:* What are the stocks and growth rates of the forests and how have they changed?

- Growing stock in forest and other wooded land 2015
- Trends in forest growing stock 1990-2015
- Trends in other wooded land growing stock 1990-2015
- Growing stock composition 2010
- Net annual increment in forest 1990-2015
- Biomass stock in forest and other wooded land 2015
- Trends in living forest biomass 1990-2015
- Carbon stock in forest and other wooded land 2015
- Carbon stock in living forest biomass 1990-2015

*Question 4:* What is the status of forest production and how has it changed over time?

- Production forest 1990-2015
- Multiple-use forest 1990-2015
- Total wood removals
- Wood fuel removals

### **Protective functions and selective ecosystem services**

*Question 5:* How much forest area is managed for protection of soil and water and ecosystem services?

- Protection of soil and water 2015
- Ecosystem services, cultural or spiritual values 2015
- Protection and ecosystem services 1990–2015

### **Biodiversity and conservation**

*Question 6:* How much forest area is protected and designated for the conservation of biodiversity and how has it changed over time?

- Conservation of biodiversity 1990-2015
- Forest area within protected areas 1990-2015
- Conservation and protected forest areas 1990–2015

### **Disturbance**

*Question 7:* What is the area of forest affected by woody invasive species?

- Area affected by woody invasive species 2005-2010

*Question 8:* How much forest area is damaged each year?

Total land area burned 2003-2012

Total forest area burned 2003-2012

### **Measuring progress towards sustainable forest management (SFM)**

#### ***i: National-scale progress towards SFM***

*Question 9:* What forest policy and regulatory framework exists to support implementation of sustainable forest management (SFM)?

Policies supporting SFM

Legislation and regulations supporting SFM

*Question 10:* Is there a national platform that promotes stakeholder participation in forest policy development?

*Question 11:* What is the forest area intended to be in permanent forest land use and how has it changed?

*Question 12:* How does your country measure and report progress towards SFM at the national level?

National platform, stakeholders, permanent forest land use and reporting

#### ***ii: Operational-scale progress towards SFM***

*Question 13:* How does your country measure and report progress towards SFM at the national level?

Methods measuring progress towards SFM

*Question 14:* What is the area of forest under a forest management plan and how is this monitored?

Forest management plan 2010 and monitoring

*Question 15:* How are stakeholders involved in the management decision-making for publicly-owned forests?

Stakeholder involvement at operational scale

*Question 16:* What is the area of forest under an independently verified forest certification scheme?

Forest Stewardship Council (FSC) certification 2000-2014

Programme for the Endorsement of Forest Certification (PEFC) 2000-2014

Domestic forest management certification 2000-2012

### **Economics and livelihoods**

*Question 17:* How much money do governments collect from and spend on forests?

*Question 18:* What is the contribution of forestry to gross domestic product (GDP)?

Revenues, expenditures and contribution of forestry to GDP (1 000 USD)

*Question 19:* Who owns and manages the forests and how has this changed?

Forest ownership 1990-2010 (1 000 ha)

*Question 20:* How many people are directly employed in forestry?

Employment in forestry 1990-2010

## **5.6 National C&I sets**

All information in this document should help with working up of national C&I sets. There are several well-developed national C&I sets based on and derived from the above introduced regional C&I sets (e.g. Austria, Estonia, Finland, Iran, the Russian Federation, and Switzerland). For further information and additional indicators of national importance, please look at the national C&I sets presented at the first project workshop in Yerevan. These were further developed, based on national and local stakeholder engagement processes using many of the tools described in Annex 1. All presentations and related background documents are available at the project website: <https://www.unece.org/forests/areas-of-work/capacity-building/unda2016-2019.html>

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## Annex 1:

### 1 Toolbox of methods to assist in the development process of national C&I

#### 1.1 Background and rationale

There is general agreement in international practice that national C&I should be developed in a top down/bottom-up process, aligning national criteria and indicators with international C&I, while taking care to ensure that national C&I, particularly indicators, grow from and reflect local characteristics and the interests of national and local stakeholders. The decision of “who participates and decides” during the indicator development process is more important than the technical aspects on how to develop them (Rametsteiner et al., 2011). Balanced representation among all key forest stakeholders is essential, as this ensures the indicators reflect the realities, interests and aspirations of a range of affected and influential stakeholders. Engaging stakeholders in indicator development and testing not only builds the relevance but also builds ownership and buy-in, which ensures more acceptance and support during the implementation of the indicators. A few weeks or months of engaging stakeholders in the process of developing and testing indicators may seem like an unnecessary luxury but can avoid numerous problems in the years ahead.

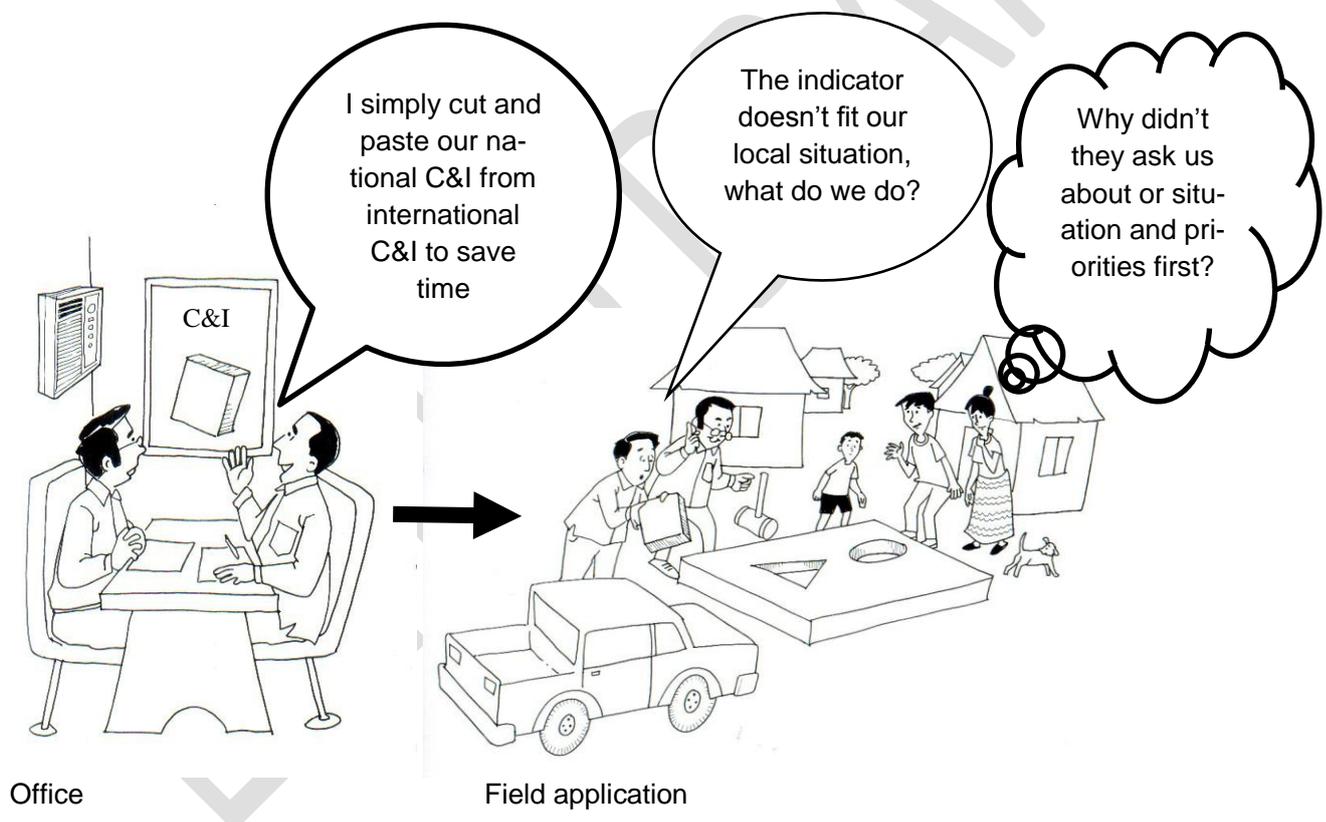


FIGURE 9: Illustrating the rationale for 'bottom-up' stakeholder engagement in national C&I development.

Key forest stakeholders are those affected by, influential on, or with expertise relevant to forestry. This may include people from outside the forest sector who have a direct influence on it or are directly affected by it, as well as people working in the sector. Stakeholders may be a formal group or organization or an informal grouping. There are many different types of stakeholders within stakeholder groups. When identifying and engaging stakeholders strike a balance between comprehensive stakeholder engagement and what can be practically achieved within time and resource constraint. The priority should be engaging a good mix of highly affected stakeholders, such as forest-dependent people and highly influential people, such as senior decision makers. A good mix of government, NGO, private sector operating at national and local level along with community representatives would be

ideal. Aim for a balance of social, economic and ecological interests in the stakeholder composition. Tool number 1, stakeholder mapping, will help to identify the range of stakeholders that should be engaged.

Next, consider a representative sample of stakeholders and sites through categorization of the forest sector. The most common way to do this is to stratify forests by forest type and seek stakeholder representation for each of those forest types. Another approach is to stratify forests by geographical or administrative region, ownership or management regime, or what the forests produce. Decide what categorization will work best for the country in securing a representative sample for that country.

Engaging stakeholders who have formal representatives can be straightforward, but it would be prudent to check that representatives have been chosen by a fair process and that they are truly representative and will listen to and report back to their stakeholder group. Avoid a stakeholder from one group claiming to represent another group, for example an urban-based NGO that says it can speak on behalf of rural forest communities. It would be preferable to find representatives from forest communities who speak on their own behalf.

Arrangements may need to be made to seek out and hold focus group discussions and interviews, especially where groups are informal or do not have formal representation e.g. forest-dependent communities or people working with informal small forest enterprises. Many tools in the tool box can help to structure the analysis of groups and to ensure that there is good engagement from the group. Use these meetings to identify representatives who can attend multi-stakeholder meetings to present the analysis from the meetings and represent their stakeholder group.

Multi-stakeholder meetings can help to build mutual understanding and to identify collective priorities in terms of indicators, through negotiation between stakeholders. This all helps to develop 'buy-in' of the outcomes from stakeholders. This can also lead to greater ownership of the C&I set and more acceptance and support in implementation. This will require careful attention to the process and methods used so that stakeholders of different power levels and capacities can operate on a level communication playing field in the multi-stakeholder meetings.

The tool box that follows provides tools for both stakeholder analysis with separate stakeholder groups and for multi-stakeholder meetings. The methods aim to help coordinators and facilitators to identify stakeholders, engage them in structured analysis, facilitate multi-stakeholder negotiation and in conducting multi-stakeholder prioritization. There are tools to help with consultative validation of draft sets of C&I.

Facilitators and coordinators of national C&I development must be seen to play a neutral role during stakeholder engagement. They must clearly explain the purpose of national C&I and guide the interactions stakeholders in analyzing and determining their own decisions about indicators. Facilitators must ensure that the process is inclusive, fair, appropriate for all stakeholders and logical and avoid any suggestion that they might try to influence outcomes with their own biases or preferences.

## 1.2 Toolbox of methods for stakeholder engagement in national C&I development

Before starting any engagement process, there must be awareness raising on what national C&I are, how the information collected in the engagement will be used and if the respondents are willing to take part and want anonymity or not. This must be done using suitable tailored communication strategies for the characteristics of different stakeholder groups, including consideration for local language or illiteracy. In some countries stakeholders may not have been consulted before on such issues, so it will take time to build trust and understanding on the purpose of the engagement. The key principle before engagement is that it is free and informed consent to engage, and if the stakeholder group declines to take part, that must be respected.

The following tool box of methods is arranged according to different potential uses in the bottom-up aspects of national C&I development processes. Tool descriptions are generic and may need to be adapted to specific context or purpose. The use of all tools is optional. Some may fit the context, others may not, and some may need to be adapted after testing them in a specific context. The sequence is a guide only and, in practice, the tools may not be used in such a linear way.

Always make sure that the purpose of the exercise is clear. Give everyone an opportunity to introduce themselves and to ask questions about the purpose. Give a brief overview of the exercise when first introducing the tool. Explaining all steps in detail at once is likely to cause confusion among participants. It is better to explain each step of the exercise before starting that part of the exercise. Invite participants at the end of the exercise to present the findings and to verify that they are an accurate representation of the analysis carried out by the participants.

Phase of the national C&I development process	Tool/method	Potential purpose for stakeholder engagement national C&I development
Planning the stakeholder engagement	1. Stakeholder mapping	Identifying all key stakeholders and then developing a plan and targeted methods to engage them.
Engaging stakeholders in analysis leading to identification of their priorities for indicators	2. Questionnaires/ interviews	Way to structure the questioning of a respondent. Use to gather information via internet, phone or face to face. Works best with individuals or small groups.
	3. Visioning	Use to assess expectations/aspirations about goals and outcomes for sustainable forest management. Defining the goal, destination/result makes it easier to determine the criteria and indicators, the building blocks that are required to deliver that goal.
	4. Problem and solution analysis	To help a group of people organize their thoughts around the causes of any problems with sustainable forest management, interlinkages between the causes, and dig deep to root causes. Getting to root causes of problems with sustainable forest management is often key to identifying elements and indicators that are necessary for transformational change in the forest sector, for example essential good forest governance elements.

Phase of the national C&I development process	Tool/method	Potential purpose for stakeholder engagement national C&I development
		Indicators can be formulated around outcomes of such elements.
	<b>5. Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis. Or a simplified version Strengths, Weaknesses and Recommendations</b>	Whereas the problem analysis goes deep, this analysis tool goes broad, harnessing analysis from positive and negative aspects identifying immediate strengths and weaknesses related to forestry, as well as more external opportunities and threats in the governance environment. Recommendations are then drawn from the analysis and indicators defined for the expected outcomes of the recommendations.
	<b>6. Scoring and prioritisation methods</b>	It is often difficult particularly in a large group to decide on priorities, these tools are to help with this. Once indicators have been identified then these methods enable collective ranking and screening of the indicators according to parameters. This is also a useful method when a pre-determined set of indicators is to be assessed and prioritized.
	<b>7. Fishbowl debate</b>	Often it is very useful to bring representatives from the previous stakeholder engagement exercises together to present their indicators and supporting analysis to each other. This method helps to 'level the playing field' among different stakeholders providing all an equal opportunity to be heard and avoid domination.
	<b>8. Scoring or priority ranking (modified to multi-stakeholder setting) - see tool 6.</b>	The same methods as in tool 6, adapted this time to a multi-stakeholder setting to find collective priorities on the indicators.
<b>Drafting the national C&amp;I</b>	<b>9. Analytical Hierarchy process – good guide to developing coherent C&amp;I set.</b>	This tool is a good way of organizing all the information from the earlier steps in the process as well as from a review of international C&I (see Annex 2) into a coherent hierarchy from the national SFM goal, to themes/principles, and below them criteria and indicators. It helps to ensure all aspects of Sustainable Forest Management are covered and helps build coherency between and avoid overlap of indicators.

Phase of the national C&I development process	Tool/method	Potential purpose for stakeholder engagement national C&I development
Screening, adjusting and elaborating indicators	10. Screening method	'Health check' to assess whether indicators are valid and/or require adjustment.
	11. Developing fact sheets for indicators	To work up the next steps towards indicator implementation. Developing an indicator fact sheet is also a good way of thinking through the requirements for and building blocks of an effective indicator and its subsequent use. It also helps to 'screen' the indicator against usefulness and feasibility in case adjustments have to be made.
Validation/Consultation on the draft	12. Poster presentations with post-its	This method is ideal for a participatory review of a draft set of criteria and indicators, allowing participants to comment on specific parts of the document directly.
	13. Multi-stakeholder panel	This method is useful to allow stakeholder representatives to give their feedback on a presentation of draft set of Criteria and Indicators, helping verify that an inclusive process was followed and that the final output takes into consideration the interests of key stakeholders. It also makes a presentation within a meeting more engaging and promotes active listening amongst appointed panellists.

### ***Tool 1: Stakeholder identification and mapping***

**Purpose:** To identify potential key stakeholders to engage in the process of national C&I development and how to engage them practically in the process.

**Procedure:**

Step 1: Identify categories of typical forest-related stakeholders and place names of stakeholders on separate cards/papers, one card, per stakeholder. A forest-related stakeholder is any category of person, formal organization or informal group that is either dependent on, has expertise on, influences or is affected by forest-related decision-making and action.

Step 2: Pre-prepare the matrix/graph framework in the figure that follows with the axis labelled as shown. Consider where the different stakeholders fit within the graph. For each stakeholder, consider "how dependent, affected by or accountable for, the stakeholders are on the forest resources/decisions on the forest resources" (y-axis) and "their level of influence over decisions on forests resources" (x-axis) and discuss where the stakeholders fit in the matrix, based on the current situation in the country. Make sure that everyone has the same understanding of the two variables. The 'effect' Y axis means the level to which the stakeholder is affected by forests, either in terms of direct livelihoods e.g. forest communities would be highly effected, or decision making e.g. a powerful policy maker in a top

down government structure might be little affected by the consequences of his/her decisions). Consider both variables at the same time to find the correct position on the graph. The group will have to find a compromise position if there are different perspectives. Ask group members to explain their stance to ensure that the suggested position on the graph can be justified and to clear up any misunderstandings.

Step 3: Discuss where stakeholders should ideally be in the matrix in terms of influencing the national C&I development and feel the effects/be accountable for the C&I. Add arrows to show the 'ideal' position of the stakeholders in the process of national C&I development.

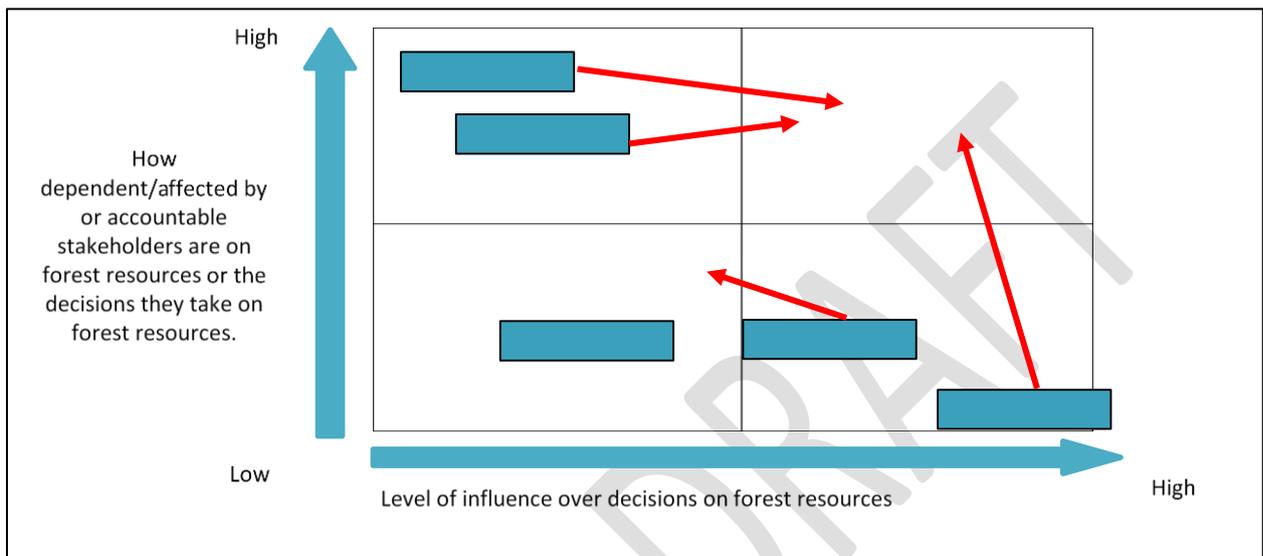


FIGURE 10: Example for Step 2 and 3 of the stakeholder mapping.

Step 4: Develop a three-column table (see below). List stakeholders in the first column and the engagement tools, either from this tool box and/or other ideas in the third column. The middle column is for arrows to link specific stakeholders to specific tools. Longer arrows indicate where most effort will be needed to give the stakeholder a stronger voice or stronger accountability. Tailor engagement methods to the stakeholder group and ensure that there is at least one tool to engage every stakeholder. In many cases, one tool will be suitable for a range of stakeholders so there could be more than one arrow linking to one tool, as shown in the table.

Stakeholders identified in Step 1 to 3	Use arrows to link tools/approaches with stakeholders.	Stakeholder engagement and communication tools.
	←→	
	←→	
	←→	
	←→	
	←→	
	←→	
	←→	



Photo 1: Stakeholder mapping, step 1 to 3 being presented and justified.

### **Tool 2: Questionnaires/ interviews**

**Purpose:** To structure the questioning of respondents, using internet, telephone or face to face interviews to gather information (works best with individuals or small groups).

#### **Procedure:**

Think carefully at the outset about the questions and ensure they are open and not leading questions. For example, a leading question on C&I development would be '*Low environmental awareness is a key problem among rural people that leads to unsustainable forest management, what indicators would you propose to measure increased environmental awareness?*'. The problem and blame are already assumed in the question which may 'lead' respondents to a certain answer. A more open question would be '*What factors are important to rural people to ensure sustainable forest management?*'

Questions that begin with 'Why' are particularly relevant for participatory approaches. 'Why' questions are effective in illuminating the viewpoint and justifications from the respondents' perspective – stepping 'into their shoes'. Many questions often work best in sets, a sequence of questions. Some sets of questions that may be useful for national C&I development are:

- Why are either negative or positive changes happening in forestry? Please come up with recommendations to address the negative aspects or build on the positive aspects. What indicators (measurable outcomes) would be useful to measure progress towards achieving these recommendations?
- What are achievable positive social, economic and ecological outcomes from sustainable forest management if recommendations in the previous question were implemented? What indicators (measurable outcomes) would be appropriate to define whether these results were achieved?

**Advice on this method** It is important to make people as relaxed as possible when conducting semi-structured interviews. Starting with small talk and not rushing into questions will help people to feel at ease. At the end of the exercise the note taker reads aloud his/her notes for verification by the participants present, changing them accordingly. Check with respondents if there is anything important they would like to add that fell outside the scope of the questions.

### ***Tool 3: Visioning***

**Purpose:** To allow participants to think about criteria and indicators by visualizing their goals/aspirations for sustainable forest management. For the facilitators, understanding the goals of different stakeholder groups will help facilitators to understand the indicators that they then propose.

#### **Procedure:**

1. Ask participants to record on a piece of paper (can be done individually or in a group) their vision of sustainable forest management. This should be realizable but aspirational positive vision for example, looking ahead 20 years. It is often good to do this initial vision mainly by drawing to get behind any jargons to see what people actually want.
2. Ask the participants to A. write down three key barriers to achieving the vision and B. three key recommendations to address the barriers and, finally three outcomes by progress towards achieving the recommendations could be measured.
3. Invite participants to present their vision and to justify it.
4. Use this as a basis for discussion, to probe further on the barriers. which will lead nicely on to the next method i.e. problem analysis.

### ***Tool 4: Problem and solution analysis***

**Purpose:** To help a group of people organize their thoughts around the causes of any problems with sustainable forest management, linkages between the causes, and finally root causes. Identifying how to tackle root causes of problems leads to strategies and indicators that relate to transformational 'foundational' pillars of sustainable forest management, often in governance aspects.

#### **Procedure:**

1. Participants can define problems, but it may be more constructive to identify a more general problem that should capture most issues e.g. 'Sustainable Forest Management potential not fully realized'
2. Ask participants to consider together the causes of the problems, write these on cards (one cause per card) and place below the problem.
3. Collectively, arrange cards (group similar cards) so that cause-cause linkages are in proper sequence, more immediate causes are closer to the problem and more underlying causes are further down. Higher cards are always consequences of those below.
4. Try to identify the deep root causes of the problem ('why?') and place them below the causes of the problems. Try to get as deep as possible into more fundamental causes of problem in the forest sector.
5. Check the logic of cause-cause linkages and, when satisfied that the cards are in the right sequence, join up using arrows.
6. Move on to consider effects in a similar process to the causes and list the effects of the problem and identify interlinkages between the effects., Just as with the causes, the higher-placed effects are consequences of those appearing below.
7. The next step is the solution analysis. Start with solutions for the root causes and then work up through the other causes towards the problem, which should be reformulated as a positive e.g. 'Sustainable Forest Management potential fully realized'. Move on to the effects and in a similar fashion reformulate them into positive consequences.
8. Identifiable indicators. In this exercise, the indicators (measurable outcomes) can be derived from two parts of the exercises, indicators that describe the effects, and indicators that de-

scribe the outcome of the solutions that address the causes of the problem. The most important indicators about transformation of the forest sector will be those associated with the root-cause-addressing solutions.



Photo 2: Problem and solution analysis.

### Tool 5: Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis

**Purpose:** To harness the analysis from positive and negative aspects identify immediate strengths and weaknesses related to forestry, as well as more external opportunities and threats in the government environment. Whereas the problem analysis goes deep, this type of SWOT analysis tool takes a broad view.

**Procedure:**

1. Start with internal – what are the immediate strengths and weaknesses of the forest sector and how it affects particular stakeholders.
2. Then list external – in the enabling environment (policies, markets, supply) – opportunities and threats.

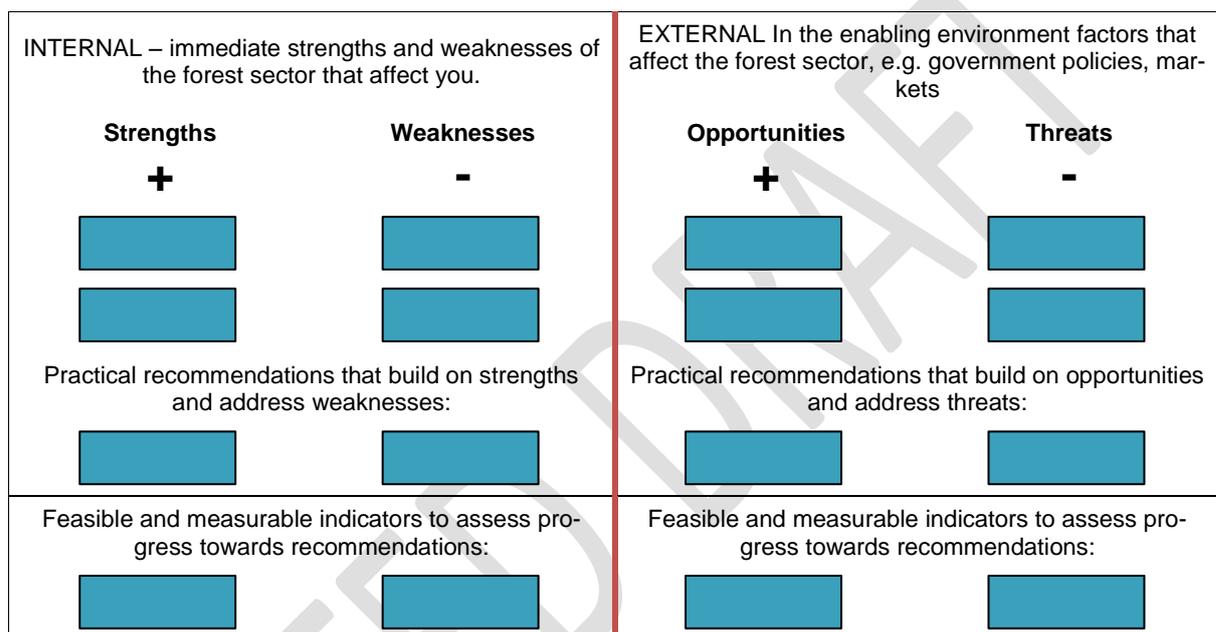


FIGURE 11: Example structure of the SWOT analysis.

3. Based on the strengths, weaknesses and opportunities and threats, develop recommendations that either address the negatives or build on the positives.
4. Finally, develop indicators that would describe expected measurable outcomes of progress if the recommendations were implemented.



Photo 3: SWOT analysis.

**Advice:** Don't get too caught up in discussions on what is external and internal, as there is overlap.

A simpler alternative to SWOT analysis is the Strength, Weakness, Recommendations/Indicators method. See the frame that follows. The UNECE project applied this method to different types of forest (see first column).

Type/Category of forest	Strengths	Weaknesses	Recommendations (building on strengths and/or tackling weaknesses).	Indicators (measurable outcomes) that can be used to measure progress as a result of recommendations being implemented.



Photo 4: Strengths, Weakness, Recommendations/Indicators method.

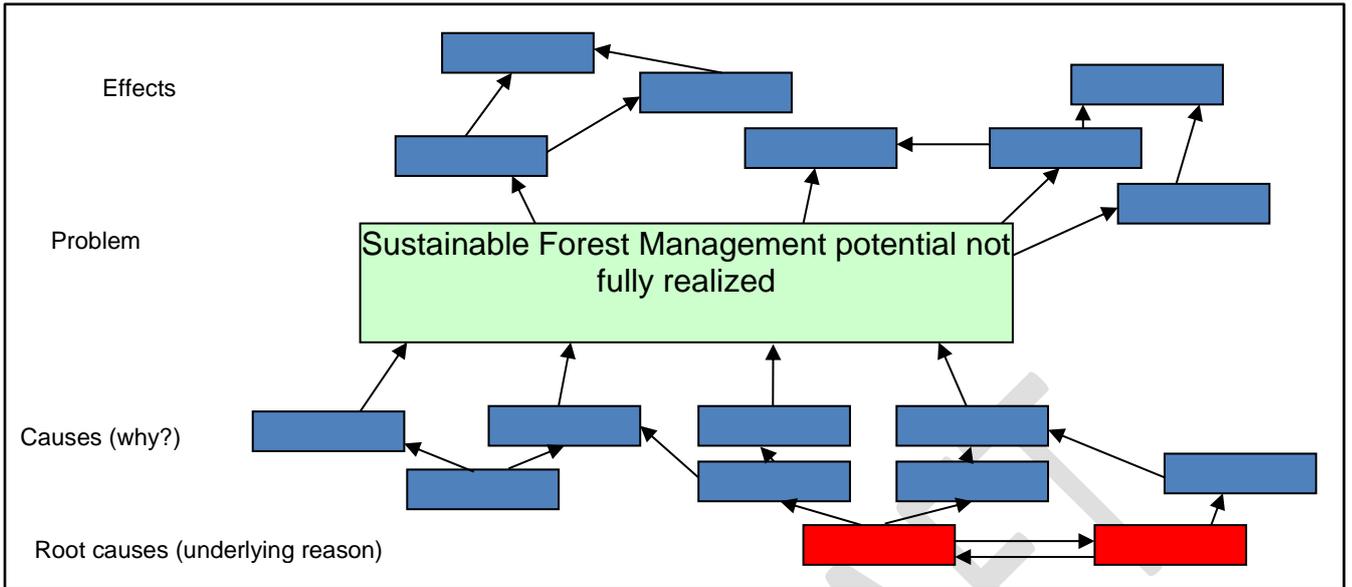


FIGURE 12: Example structure for the problem analysis.

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### **Tool 6. Scoring and prioritisation methods.**

**Purpose:** To help groups to screen indicators for importance and to try to prioritize them through a collective ranking exercise.

**Procedure:**

This is a useful method to test the relevance of a pre-determined set of indicators and to screen indicators in terms of their importance. In cases where there are many indicators, it may help to reduce them to a more manageable number.

Numerous methods are available to help participants prioritise indicators. Two basic examples are described next.

The first scoring exercise involves judging an indicator on its merit, using a scale of 5 to 1, for example on, where 5 is extremely important, 4 is very important, 3 is moderately important, 2 is not very important and 1 is irrelevant. Often participants are asked to score against different parameters, as in the table below. In the table below when the totals are added up horizontally, the top preference gets the highest score.

Indicators	Score against importance and relevance. 5 to 1	Score against feasibility and practicality 5 to 1	Score against clarity 5 to 1	Total score	Final order of preference
A					
B					
C					
D					

The second example is a priority-ranking tool, which assesses indicators against each other, ranking them in order of how best they match the parameter compared to the others. In this example there are 4 criteria. The top-ranked criterion is given a score of 4 (the highest priority gets the highest number not the lowest), the next 3, the next 2 and the next 1. When the totals are added up horizontally, the top preference gets the highest score so that the final order of preference can be determined.

Indicators	Pick importance and relevance. 4 to 1	Score against feasibility and practicality 4 to 1	Score against clarity 4 to 1	Totals	Final order of preference
A					
B					
C					
D					



### **Tool 7: Fishbowl debate**

**Purpose:** To bring together representatives from the previous stakeholder engagement exercises to present priorities to each other. This helps to 'level the playing field' among different stakeholders, providing an equal opportunity for all to be heard and to avoid domination.

**Procedure:**

1. Set up the chairs as in the photograph and explain the purpose and procedure of the exercise (Demonstrating how the method works may be a helpful first step).
2. Invite a representative from the first stakeholder group to present its indicators and to justify them (e.g. for 10 minutes), and afterwards to sit in the centre.
3. Invite others to take the central chairs if they wish to critique or support the presentation. The first person to arrive will be the first to speak. Only people who occupy the central chairs may speak. No-one from the outer ring can speak until they have moved to one of the central chairs.
4. Limit the time for comment to one minute, after which respondents must return to the outer ring.
5. The presenter remains in the centre and can respond at any time.
6. The facilitator judges when to 'close' the debate, after which NO NEW people can come to the centre. Allow those in the middle at this point to finish their comments.
7. Allow the presenter a short time to make any final remarks in support of that stakeholder's indicators.
8. Invite the next stakeholder group to present its indicators.
9. Allocate a similar amount of time for each stakeholder group in the debate.



**Photo 6:** Fishbowl debate method.

**Advice:** The fishbowl debate is designed to promote discussion and listening, it does not in itself lead to an agreement as to the outcome of a discussion. For that a priority ranking or scoring exercise can be a useful conclusion that directly follows the fishbowl debate to bring the discussion to an outcome.

Not all participants are comfortable coming to the centre to speak, so it is important to also use alternative methods, for example methods where cards are used to engage participants and get their ideas.

**Tool 8: Priority ranking or scoring exercise adapted to multi-stakeholder setting**

**Purpose:** To find collective priorities for the indicators using the method in tool 6 adapted to a multi-stakeholder setting.

**Procedure:** After a multi-stakeholder debate, repeat the exercise in step 6 twice: first in separate stakeholder groups to agree priorities within the group and second, transfer the results of the separate stakeholder groups to a multi-stakeholder ranking or scoring framework.

The example below of a scoring framework identifies three stakeholder groups but there may be many more and, of course, many more indicators. A ranking method could also be used. See example in Tool 6.

Indicator	Forest dependent people. Score from 5 to 1	Government forestry department. Score from 5 to 1	Private sector. Score from 5 to 1.	Total score	Final collective order of preference
A					
B					
C					
D					

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### ***Tool 9: Analytical Hierarchy Process – guide to developing coherent C&I set***

**Purpose:** To organize information from the earlier steps in the process into a coherent hierarchy from the goal, to themes/principles, and below them criteria and indicators. This should ensure that all aspects of Sustainable Forest Management have been covered and avoid overlap between indicators. It usually works best with a small group of key representatives from different stakeholder groups, experts and the facilitation team.

#### **Procedure:**

1. First, remind everyone of the hierarchy so they understand the logic. See figure 3 in chapter 2.2.
2. Agree on the goal for Sustainable Forest Management by reviewing earlier steps, for example the visioning exercise and pulling together common elements.
3. Do the exercise in three thematic groups (or one group repeats the exercise three themes), i.e. 1. Forest extent, condition and ecology, 2. Socio-economic aspects and 3. Governance aspects.
4. Let each group decide the objective of theme, which can be derived from earlier outputs.
5. Fill in the matrix from left to right, drawing the indicators from international indicator sets provided in this guideline combined with/adapted to indicators that have emerged through the stakeholder engagement process.
6. Unless participants filling the matrix are at least 75 per cent confident that the indicator can be measured (see last column), change the means of verification and/or the indicator itself until they identify an indicator and means of verification that are both feasible and practical to measure.



<b>A. Criteria</b>	<b>B. Indicators</b>	<b>C. Means of Verification/measure</b>	<b>D. Positive assumption of feasibility</b>
Formulate as outcomes/results. Can be modified to national context but aim for alignment with international criteria. Avoid overlap between criteria.	Must reflect national priorities/context (from the engagement process) but where possible be aligned to/modified from international sets. Indicators should be simple and clear, be a complementary mix of both quantitative and qualitative (try to have both kinds for each criteria). At national level, the best indicators should be Specific, Measurable, Achievable, Realistic and Time-bound (SMART). Avoid overlap between indicators. Number indicators see below.	The clearly identified concrete source of information/record that verifiably demonstrate that the target is being achieved. (although not part of a final C&I set, very useful to ascertain feasibility)	Confidence greater than 75% that indicator – information to verify it can be practically and feasibly assessed, within normal government resources. If less than 75% revise the indicator to something more achievable.

FIGURE 13 Criteria and Indicators related to forest extent, condition and ecology

**Further tables: Repeat the same table as above, with a focus on Criteria and Indicators related to socio-economic aspects and finally governance aspects.**

**Advice:**

Firstly, try to avoid overlap between indicators.

Secondly, use the international indicator sets as a reference so that no major aspects are missed.

Thirdly, after this exercise reformulate the results in a tabular form if necessary, with indicators in sequence and aligned to an international set of criteria.

### **Tool 10: Screening and adjusting indicators.**

**Purpose:** To screen indicators to check that they are valid and useful in their current form and, if not, to adjust them.

#### **Procedure:**

1. Screen indicators using the following table format.
2. Please be honest in the screening, if there are doubts about the indicator passing to the next level, modify or even reject it. There must be justification for accepting, modifying or rejecting.
3. If the indicator requires modification or rejection, reformulate the indicator until it either passes through the screening exercise successfully or reject it from the national C&I set.

	Yes (tick below)	Maybe (tick below)	No (tick below)	Comment/Justification/ evidence (even if yes)
<b>1. Relevance:</b> Is the indicator and the information it will generate essential to either measure SFM or advance SFM in the national context?	Move to row below.	Modify to make more relevant	Exclude	
<b>2. Specificity:</b> Is the indicator clear enough in what will be measured and how?	Move to row below	Modify to make more specific	Exclude	
<b>3. Method and data availability:</b> Are the methods to gather information, and sufficient information easily accessible in the national context.	Move to row below	Modify the indicator or methods to make information needs achievable	Exclude	
<b>4. Feasibility.</b> Are the resources and capacities in place to measure on a regular basis?	Fine to proceed	Modify indicator or capacities to make more feasible	Exclude	

**Advice:** If there is any doubt that the indicator passes all four questions, even after reformulation, remove it. If in doubt, cut it out.

### **Tool 11: Developing fact sheets for indicators**

**Purpose:** To elaborate on and clarify how information will be gathered, managed and used around specific indicators. This helps to develop the full information system around indicators that will be implemented and institutionalised. Developing an indicator fact sheet is also a good way of thinking through the requirements for and building blocks of an effective indicator and its subsequent use. It also helps to 'screen' the indicator against usefulness and feasibility and if adjustments have to be made.

**Procedure:**

1. Select the indicators that were successfully screened in Tool 10 and work up the requirements as requested in the table that follows.
2. Present the fact sheets to a panel who will assess against different criteria. (Turn to section 4.3 for more information on how to fill out fact sheets, and examples).

<b>Criterion the ultimate outcome:</b>	
<b>Number of Indicator:</b>	<b>Short text of the indicator:</b> <b>Full text:</b>
<b>Rationale:</b> <i>What will be the purpose of generating information on this indicator? How will this information be used to advance Sustainable Forest Management?</i>	
<b>Data sources and methods, you will use to generate data:</b>	
<b>Measurement unit and frequency of measurement required:</b>	
<b>Targets and/or thresholds – might also be time specific:</b>	
<b>Feasible institutional roles and responsibilities:</b> <i>Which institutions will collect, manage and use the data? Try to build from and on what exists</i>	
<b>Key challenges:</b>	
<b>Recommendations to address these challenges:</b>	

**Advice.** As with tool 11, if there is any doubt that the indicator can be feasibly implemented after filling the data sheet, either reformulate it until it is feasible or, as in tool 11...if in doubt, cut it out!

**Tool 12: Poster with post-it method**

**Purpose:** This method is ideal for a participatory review of a draft set of criteria and indicators, allowing participants to comment on the document directly. Posters with the criteria and indicators can be posted for example in halls in forest dependent communities for feedback.

**Procedure**

1. After preparing print outs of the national criteria and indicator set with large font on a poster, place them on the wall or board where the meeting is being held and present them.
2. After the presentation, participants can write comments on post-its (stickers) and stick directly on the indicators they want to comment on. Posters can be left up for some time to get comments.
3. After all the comments have been placed on the posters, it is good to ask participants to come and justify the comments.

4. It is important for the facilitation/coordination team to type up the comments within the document for consideration later as to whether the comment merits a modification or not in the Criteria and Indicator set.



Photo 7: Poster with post-it method.

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### **Tool 13: Multi-stakeholder panel**

**Purpose:** This allows stakeholder representatives to give feedback on a presentation of draft set of Criteria and Indicators, helping to verify that it followed an inclusive process and that the final output considers the interests of key stakeholders.

#### **Procedure:**

1. Identify a range of good representatives from each of the key stakeholders that took part in the process.
2. Seat representatives from each of the stakeholder groups at a table, before the presentation of the draft national C&I. Rotate representatives for different sections of the presentation.
3. Ask representatives to assess the relevance of the criteria and indicator from their perspective, after each section has been presented.
4. Agree how to resolve problems if stakeholder representatives raise serious concern about the relevance of any criteria and indicators.



Photo 8: Multi-stakeholder panel method

**Advice:** After drafting the document is taking into account any feedback, circulate the draft for further comment. Even after a document has been agreed and finalized, continue to review it with stakeholders from time to time. Many of the methods in this toolbox can be used for such reviews.

## Annex 2:

### Shopping List of Indicators

Listed below are extracts of the indicator sets of FOREST EUROPE (FE), Montréal Process (MP), LFCC Process (LFCC), ITTO and FRA. They are grouped according to the internationally-agreed seven thematic elements of SFM (UNFF, 2007).

Indicators addressing the same topic or issue are grouped and highlighted in grey or white. There is a heading if there are more than two indicators per sub group. Three digits identify the indicators by: the first indicates the thematic element, the second the sub group and the third the indicator e.g. indicator “2.3.2 Primary forest” belongs to the thematic element “2. Biological diversity”, sub group “3 Naturalness” and is the 2<sup>nd</sup> indicator of that sub group. It would be ideal to choose only one suitable indicator from such a sub group but sometimes two indicators might be needed to cover national needs. There may be times when none of the listed indicators fits. The shopping list provides inspiration and food for thought. It is not a compulsory source of indicators. For a proper application of indicators and methods for stakeholder engagement, find guidance in the Toolbox section in Annex 1.

#### 1. Extent of forest resources

The theme expresses an overall desire to have adequate forest cover and stocking, including trees outside forests, to support the social, economic and environmental dimensions of forestry. For example, the existence and extent of specific forest types are important as a basis for conservation efforts. The theme encompasses ambitions to reduce deforestation and to restore and rehabilitate degraded forest landscapes. It also includes the important function of forests and trees outside forests to store carbon and thereby contribute to moderating the global climate.

Sub Group	No.	Ref.	Indicator in English	Название индикатора на русском
1.1 FOREST AREA	1.1.1	ITTO	Extent and percentage of total land area under comprehensive land-use plans	Площадь и процент всей площади земель, покрытых всесторонними планами землепользования
	1.1.2	ITTO	Extent of forests committed to production and protection	Площадь лесов, отведенных под производство и защиту
	1.1.3	ITTO	Extent and percentage of total land area under each forest type	Площадь и процент всей земли под каждым типом лесов
	1.1.4	ITTO	Forest area in compliance schemes	Площадь лесов в схемах соответствия
	1.1.5	LFCC	Increase or decrease of forest area, with the reason	Увеличение или сокращение площади леса, вместе с причиной
	1.1.6	FE	Area of forest and other wooded land, classified by forest type and by availability for wood supply, and share of forest and other wooded land in total land area	Площадь лесов и других покрытых древесной растительностью земель, классифицированных по типу леса и возможности их эксплуатации, а также доля лесов и других покрытых древесной растительностью земель в общей площади земель
	1.1.7	FRA	Forest and other wooded land	Лесные и другие лесистые земли
	1.1.8	FRA	Extent of forest	Площадь лесов

1.2 PRODUCTION	1.2.1	FRA	Production forest	Производственный лес
	1.2.2	MP	Area and percentage of forest land and net area of forest land available for wood production	Площадь и доля лесных земель, а также площадь лесных земель, доступных для эксплуатации
	1.3.1	FRA	Multiple-use forest	Лес многоцелевого назначения
	1.4.1	FRA	Other wooded land	Другие лесистые земли
1.5 CHANGE	1.5.1	ITTO	Change in forested area	Изменение площади лесов
	1.5.2	FRA	Forest expansion	Расширение лесов
1.6 CHARACTERISTICS	1.6.1	MP	Area and percentage of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure	Площадь и доля лесов по типам лесных экосистем, стадиям сукцессии, классам возраста и формам собственности
	1.6.2	FRA	Forest characteristics	Характеристики леса
	1.6.3	LFCC	Forest area, age class in ecozone	Площадь леса, возрастной класс в экозоне
	1.6.4	LFCC	Forest area, age class all types of soil and protected point zone from geomorphology point of view	Площадь леса, возрастной класс всех видов почв и охраняемых территорий с точки зрения геоморфологии
	1.7.1	LFCC	Percentage of crown cover	Процент древесного покрова
1.8 GROWING STOCK	1.8.1	FE	Growing stock on forest and other wooded land, classified by forest type and by availability for wood supply	Запас древесины в лесах и на других покрытых древесной растительностью землях, классифицированных по типу леса и возможности их эксплуатации
	1.8.2	MP	Total growing stock and annual increment of both merchantable and non-merchantable tree species in forests available for wood production	Общий запас древесины и годовой прирост коммерческой и некоммерческой древесины в лесах, доступных для эксплуатации
	1.8.3	MP	Area, percent, and growing stock of plantations of native and exotic species	Площадь, доля занимаемой площади и запас древесины плантаций аборигенных и экзотических видов
	1.8.4	FRA	Growing stock in forest and other wooded land	Запас древесины в лесу и на других лесистых землях
	1.8.5	FRA	Trends in forest growing stock	Тренды запаса древесины в лесу
	1.8.6	FRA	Trends in other wooded land growing stock	Тренды запаса древесины на других лесистых землях
	1.8.7	FRA	Growing stock composition	Состав запасов древесины
	1.9.1	FE	Age structure and/or diameter distribution of forest and other wooded land, classified by availability for wood supply	Возрастная структура и/или распределение по диаметру деревьев в лесах и на других покрытых древесной растительностью землях, классифицированных по возможности их эксплуатации

1.10 CARBON STOCK	1.10.1	FE	Carbon stock and carbon stock changes in forest biomass, forest soils and in harvested wood products	Запасы углерода и изменения запасов углерода в биомассе лесов, лесных почвах и в заготовленной древесной продукции
	1.10.2	MP	Total forest ecosystem carbon pools and fluxes	Общий пул и потоки углерода в лесных экосистемах
	1.10.3	MP	Total forest product carbon pools and fluxes	Общий пул и потоки углерода в лесной продукции
	1.10.4	ITTO	Forest carbon stock	Запасы углерода в лесу
	1.10.5	FRA	Carbon stock in forest and other wooded land	Запасы углерода в лесу и на других лесистых землях
	1.10.6	FRA	Carbon stock in living forest biomass	Запасы углерода в живой лесной биомассе
	1.10.7	LFCC	Carbon storage in forest ecosystems, according to forest type and age class	Накопленный углерод в лесных экосистемах, согласно типам и возрастным классам леса
1.11 CARBON CHANGE	1.11.1	LFCC	Changes of net carbon in forest ecosystem	Изменение нетто углерода в лесной экосистеме
	1.11.2	LFCC	Net change in forest carbon production	Нетто изменение в производстве углерода в лесу
	1.12.1	LFCC	Carbon emission in forest sector	Выброс углерода в лесном секторе
	1.13.1	LFCC	Net carbon destruction	Нетто разрушение углерода

## 2. Biological diversity

Forests are the terrestrial ecosystems with the highest degree of biodiversity. Conserving and managing biological diversity at ecosystem (landscape), species and genetic levels including protecting areas with fragile ecosystems, will maintain the diversity of life and provide opportunities to develop new products in the future, including medicines. Genetic improvement is also a means of increasing forest productivity, e.g. by ensuring high levels of wood production in intensively managed forests.

Sub Group	No.	Ref.	Indicator in English	Название индикатора на русском
2.1 SPECIES	2.1.1	FE	Area of forest and other wooded land, classified by number of tree species occurring	Площадь лесов и других покрытых древесной растительностью земель, классифицированных по количеству древесных пород
	2.1.2	MP	Species diversity	Видовое разнообразие
2.2 REGENERATION	2.2.1	FE	Total forest area by stand origin and area of annual forest regeneration and expansion	Общая площадь лесов по происхождению и площадь ежегодного восстановления и экспансии лесов
	2.2.2	LFCC	Natural regeneration of species	Естественное восстановление видов
	2.2.3	FRA	Other naturally regenerated forest	Другие естественно регенерировавшие леса
	2.2.4	LFCC	Forest area which regenerate successfully after harvesting	Площадь леса, успешно восстанавливающаяся после заготовки
	2.2.5	FRA	Other naturally regenerated and planted forest	Другие естественно регенерировавшие и посаженные леса
2.3 NATURALNESS	2.3.1	FE	Area of forest and other wooded land by class of naturalness	Площадь лесов и других покрытых древесной растительностью земель по классу естественности
	2.3.2	FRA	Primary forest	Первичный лес
	2.3.3	FRA	Planted forest	Посаженные леса
	2.3.4	FRA	Mangroves	Мангровые заросли
2.4 SPECIES DISTRIBUTION	2.4.1	MP	Number of native forest associated species	Число аборигенных видов, связанных с лесом
	2.4.2	LFCC	Population of main and key species	Популяция основных и ключевых видов
	2.4.3	LFCC	Population of species in a selected forest	Популяция видов в конкретном лесу
	2.4.4	LFCC	Species distributions	Распределение видов
2.5 INVASIVE SPECIES	2.5.1	LFCC	Endemic and invader species	Эндемичные и инвазивные виды
	2.5.2	FRA	Area affected by woody invasive species	Площадь, пораженная инвазивными древесными видами
	2.5.3	FE	Area of forest and other wooded land dominated by introduced tree species	Площадь лесов и других покрытых древесной растительностью земель с преобладанием интродуцированных древесных пород
	2.6.1	FE	Volume of standing deadwood and of lying deadwood on forest and other wooded land	Объем стоящей на корню и лежащей на земле мертвой древесины в лесах и на других покрытых древесной растительностью землях

2.7 CONSERVATION	2.7.1	FE	Area managed for conservation and utilisation of forest tree genetic resources (in situ and ex situ genetic conservation) and area managed for seed production	Площадь, управляемая для сохранения и использования лесных древесных генетических ресурсов (сохранения генетических ресурсов непосредственно на месте и вне их естественного ареала) и площадь для производства семян
	2.7.2	MP	Status of on-site and off-site efforts focused on conservation of genetic diversity	Состояние усилий <i>in situ</i> и <i>ex situ</i> , направленных на сохранение генетического разнообразия
	2.7.3	ITTO	<i>In situ</i> conservation of genetic variation within specified forest tree species	<i>In situ</i> консервация генетической изменчивости конкретных видов лесных деревьев
	2.7.4	MP	Status of on-site and off-site efforts focused on conservation of species diversity	Состояние усилий <i>in situ</i> и <i>ex situ</i> , направленных на сохранение видового разнообразия
	2.7.5	MP	Number and geographic distribution of forest associated species at risk of losing genetic variation and locally adapted genotypes	Число и географическое расположение связанных с лесом аборигенных видов, находящихся под угрозой потери генетического разнообразия, и локально адаптированных генотипов
	2.7.6	MP	Population levels of selected representative forest associated species to describe genetic diversity	Популяционный уровень связанных с лесом репрезентативных видов, выбранных для описания генетического разнообразия
	2.7.7	ITTO	Procedures for conserving tree species diversity in natural tropical forests	Процедуры консервирования разнообразия видов деревьев в естественных тропических лесах
	2.7.8	LFCC	Genetic diversity in seed reforestation	Генетическое разнообразие семенного лесовосстановления
	2.7.9	LFCC	<i>In situ</i> and <i>ex situ</i> conservation of endanger species and species with economical value in each ecozone	Консервация видов, находящихся под угрозой, и видов, имеющих экономическую ценность, <i>in situ</i> и <i>ex situ</i> в каждой экозоне
2.8 FRAGMENTATION	2.8.1	MP	Fragmentation of forests	Фрагментация лесов
	2.8.2	LFCC	Forest type fragmentation	Фрагментация типов лесов
	2.8.3	FE	Area of continuous forest and of patches of forest separated by non-forest lands	Площадь сплошных лесов и участков леса, разделенных нелесными землями
2.9 THREATENED SPECIES	2.9.1	FE	Number of threatened forest species, classified according to IUCN Red List categories in relation to total number of forest species	Число охраняемых видов лесной фауны и флоры, классифицированных в соответствии с категориями Красного списка МСОП, по отношению к общему числу видов лесной фауны и флоры
	2.9.2	MP	Number and status of native forest associated species at risk, as determined by legislation or scientific assessment	Число и статус аборигенных видов, связанных с лесом и находящихся под угрозой исчезновения, согласно природоохранному законодательству или оценками экспертов
	2.9.3	ITTO	Threatened forest-dependent species	Зависимые от леса виды, находящиеся под угрозой

	2.9.4	LFCC	Endangered species in forest	Лесные виды, находящиеся под угрозой исчезновения
2.10 PROTECTED AREAS	2.10.1	FE	Area of forest and other wooded land protected to conserve biodiversity, landscapes and specific natural elements, according to MCPFE categories	Площадь лесов и других покрытых древесной растительностью земель, охраняемая с целью сохранения биологического разнообразия, ландшафтов и особых природных элементов, согласно категориям Министерской конференции по защите лесов в Европе
	2.10.2	MP	Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage	Площадь и доля лесов особо охраняемых природных территорий по типам леса, классам возраста или стадиям сукцессии
	2.10.3	FRA	Conservation of biodiversity	Сохранение биоразнообразия
	2.10.4	FRA	Forest area within protected areas	Площадь лесов внутри охраняемых территорий
	2.10.5	FRA	Conservation and protected forest areas	Заповедные и охраняемые лесные территории
	2.10.6	FRA	Protection and ecosystem services	Защитные и экосистемные услуги
	2.10.7	ITTO	Forest extent in protected areas	Площадь лесов в охраняемых районах
	2.10.8	LFCC	Forest protected zones	Лесные охраняемые зоны
	2.10.9	LFCC	Area of protected forest ecosystems	Площадь охраняемых лесных экосистем
	2.10.10	ITTO	Buffer zone management and connectivity of protected forest areas	Управление буферных зон и связанность охраняемых лесов
2.11 Biod. Cons.	2.11.1	ITTO	Biodiversity conservation measures in natural production forests	Меры консервации биологического разнообразия в естественных производственных лесах
	2.11.2	ITTO	Biodiversity conservation in planted forests	Консервация биологического разнообразия в лесонасаждениях
	2.12.1	LFCC	Forest parks	Лесные парки

### 3. Forest health and vitality

There are increasing concerns on the resilience of forests, also in the wake of climate change effects with increasing occurrence of damaging events like droughts, storms or forest fires. Managing forests helps to minimize the risks and impacts of unwanted disturbances, including also airborne pollution, storm felling, invasive species, pests, diseases and insects. Such disturbances may impact social and economic as well as environmental dimensions of forestry. Reliable, related data may facilitate active institution support for adaptation and restoration.

Sub Group	No.	Ref.	Indicator in English	Название индикатора на русском
3.1 DEPOSITION	3.1.1	ITTO	Forest condition	Состояние леса
	3.1.2	FE	Deposition and concentration of air pollutants on forest and other wooded land	Осаждение и концентрация загрязняющих атмосферу веществ на лесных и других покрытых древесной растительностью землях
	3.1.3	FE	Chemical soil properties (pH, CEC, C/N, organic C, base saturation) on forest and other wooded land related to soil acidity and eutrophication, classified by main soil types	Химические свойства почвы (рН, емкость катионного обмена, отношение содержания органического углерода к общему азоту, содержание органического углерода, насыщенность основаниями) в лесах и на других покрытых древесной растительностью землях, связанных с кислотностью почв и эвтрофикацией, классифицированных по основным типам почв
	3.2.1	FE	Defoliation of one or more main tree species on forest and other wooded land in each of the defoliation classes	Дефолиация одной или нескольких основных древесных пород в лесах и на других покрытых древесной растительностью землях для каждого из классов дефолиации
3.3 DAMAGED FORESTS	3.3.1	FE	Forest and other wooded land with damage, classified by primary damaging agent (abiotic, biotic and human induced)	Поврежденные леса и другие покрытые древесной растительностью земли, классифицированные по основному фактору повреждения (абиотический, биотический и антропогенный).
	3.3.2	MP	Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive species) beyond reference conditions	Площадь и доля лесов, подверженных негативным биотическим процессам и факторам (вредные насекомые, болезни леса, инвазивные виды), которые превышают обычные (естественные) показатели
	3.3.3	MP	Area and percent of forest affected by abiotic agents (e.g. fire, storm, land clearance) beyond reference conditions	Площадь лесов, подверженных негативным абиотическим факторам (лесные пожары, ураганы, расчистка земель), которые превышают обычные (естественные) показатели
	3.3.4	LFCC	Forest area damaged by: forest fire, insects, pests, disease, wood harvesting (forest health and vigour)	Площадь леса, поврежденная: лесным пожаром, насекомыми, вредителями, болезнями, заготовкой древесины (здоровье и энергия леса)
	3.3.5	LFCC	Forest area damaged by: drought, acid wash and ozone impact	Площадь леса, поврежденная: засухой, влиянием кислотных дождей и озона

	3.3.6	FRA	Total land area burned	Общая площадь выгоревших земель
	3.3.7	FRA	Total forest area burned	Общая площадь выгоревших лесов
	3.3.8	LFCC	Area of watershed which are damaged (degraded) because of land use change in last 20 years	Площадь бассейнов рек, поврежденных (деградировавших) из-за изменения землепользования в течении последних 20 лет
	3.3.9	ITTO	Threats to forests caused directly by human activities	Угрозы для леса, вызванные непосредственно человеческой деятельностью
	3.3.10	ITTO	Reduced impact harvesting and silvicultural operations	Заготовка и лесоводство со сниженным воздействием
3.4 DEGRADATION	3.4.1	FE	Trends in forest land degradation	Тенденции в деградации лесных земель
	3.4.2	LFCC	Forest ecosystem degradation	Деградация лесных экосистем
	3.4.3	ITTO	Degraded forests and landscapes restored	Восстановленные деградированные леса и ландшафты
	3.4.4	FRA	Deforestation	Обезлесение
3.5 RESTORATION	3.5.1	ITTO	Area of formerly degraded forest or forest land restored	Площадь ранее деградированных восстановленных лесов и лесных земель
	3.5.2	LFCC	Rehabilitation of arid and semi-arid zone	Восстановление засушливых и полужасушливых зон
	3.5.3	FRA	Reforestation	Лесовосстановление
	3.5.4	LFCC	Afforestation	Лесовосстановление
3.6 RESILIENCE	3.6.1	ITTO	Vulnerability of forests to natural disturbances	Уязвимость лесов по отношению к природным катаклизмам
	3.6.2	ITTO	Forest resilience and climate-change adaptation	Стойкость лесов и адаптация к изменению климата

#### 4. Productive functions of forest resources

Forests and trees outside forests provide a wide range of wood and non-wood forest products. This theme expresses the ambition to maintain an ample and valuable supply of primary forest products, while at the same time ensuring that production and harvesting are sustainable and do not compromise the management options of future generations.

Sub Group	No.	Ref.	Indicator in English	Название индикатора на русском
4.1 INCREMENT	4.1.1	FE	Balance between net annual increment and annual fellings of wood on forest available for wood supply	Баланс между чистым годовым приростом и ежегодными рубками в лесах доступных для эксплуатации
	4.1.2	FRA	Net annual increment in forest	Чистый годовой прирост в лесу
	4.1.3	LFCC	Mean annual increments (growth) based upon forest type and age class	Среднегодовой прирост, в зависимости от вида и возрастного класса леса
4.2 REMOVALS	4.2.1	MP	Annual harvest of wood products by volume and as a percentage of net growth or sustained yield	Ежегодная заготовка древесины, выраженная в объеме и доле от чистого прироста или расчетной лесосеки
	4.2.2	LFCC	Annual wood production based on a sustainable harvesting	Годовое производство древесины, основанное на устойчивой заготовке
	4.2.3	ITTO	Natural production forest inventories, by product	Инвентаризация естественного лесоводства, по продуктам
	4.2.4	ITTO	Actual and allowable harvest of wood and non-wood products in natural forests	Фактическая и допустимая заготовка древесных и недревесных продуктов в естественных лесах
	4.2.5	ITTO	Actual harvest of wood and non-wood products in planted forests	Фактическая заготовка древесных и недревесных продуктов в лесопосадках
	4.2.6	FRA	Total wood removals	Совокупная заготовка древесины
	4.2.7	FRA	Woodfuel removals	Заготовка древесного топлива
4.3 BIOMASS	4.3.2	LFCC	Percentage of biomass as volume (general type of forest)	Процент биомассы как объем (общий тип леса)
	4.3.3	FRA	Biomass stock in forest and other wooded land	Запас биомассы в лесу и на других лесистых землях
	4.3.4	FRA	Trends in living forest biomass	Тренды живой лесной биомассы
4.4 VALUE OF WOOD	4.4.1	FE	Quantity and market value of roundwood	Количество и рыночная стоимость круглого леса
	4.4.2	MP	Value and volume of wood and wood products production, including primary and secondary processing	Стоимость и объем производства древесины и древесной продукции, включая первичную и вторичную переработку
	4.4.3	ITTO	Value of domestically produced forest products and environmental services	Стоимость лесных продуктов и экологических услуг, произведенных внутри страны
	4.4.4	LFCC	(Forest production), total tree growth, economical and non-trade value trees	(Лесное производство), общий рост деревьев, деревьев, имеющих экономическую ценность и не имеющих торговую ценность

	4.5.1	LFCC	Value of secondary products from harvested wood product	Стоимость вторичных продуктов, полученных от продуктов заготовленной древесины
4.6 Non-WOOD PRODUCTS	4.6.1	LFCC	Annual non-wood production based on a sustainable harvesting	Годовое недревесное производство, основанное на устойчивой заготовке
	4.6.2	FE	Quantity and market value of non-wood goods from forest and other wooded land	Количество и рыночная стоимость недревесных продуктов из лесов и других покрытых древесной растительностью земель
	4.6.3	MP	Value of non-wood forest products produced or collected	Стоимость и количество произведенной или собранной недревесной продукции
	4.6.4	LFCC	Value of non-wood products (non-trading)	Стоимость недревесной продукции (неторговой)
	4.6.5	MP	Annual harvest of non-wood forest products	Ежегодный объем заготовок недревесных лесных ресурсов
4.7 SERVICES	4.7.1	FE	Value of marketed services on forest and other wooded land	Стоимость платных услуг в лесах и других покрытых древесной растительностью землях
	4.7.2	LFCC	Value of forest related services (non-trading)	Стоимость услуг, связанных с лесом (неторговой)
	4.8.1	LFCC	Suitable habitat for wildlife with economic value	Подходящая естественная среда для имеющих экономическую ценность диких животных

## 5. Protective functions of forest resources

The theme addresses the role of forests and trees outside forests in moderating soil, hydrological and aquatic systems, maintaining clean water (including healthy fish populations) and reducing the risks and impacts of floods, avalanches, erosion and drought. Protective functions of forest resources also contribute to ecosystem conservation efforts and have strong cross-sectoral aspects, because the benefits to agriculture and rural livelihoods are high.

Sub Group	No.	Ref.	Indicator in English	Название индикатора на русском
5.1 SOIL AND WATER PROTECTION	5.1.1	FE	Area of forest and other wooded land designated to prevent soil erosion, preserve water resources, maintain other protective functions, protect infrastructure and managed natural resources against natural hazards	Площадь лесов и других покрытых древесной растительностью земель, предназначенная для предотвращения эрозии почвы, сохранения водных ресурсов, поддержания других защитных функций, защиты инфраструктуры и управляемых природных ресурсов от стихийных бедствий
	5.1.2	FRA	Protection of soil and water	Защита почвы и воды
	5.1.3	ITTO	Forest area managed primarily for the protection of soil and water	Площадь лесов, управляемых в первую очередь для защиты почв и воды
	5.1.4	ITTO	Area of production permanent forest estates (PFE) considered environmentally sensitive and protected	Площадь считающихся экологически чувствительными и защищенными производственных ПЛФ
	5.1.5	MP	Area and percent of forest whose designation or land management focus is the protection of soil or water resources	Площадь и доля лесов, которые предназначены или управляются с целью защиты почвы или водных ресурсов
	5.1.6	MP	Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources	Доля лесохозяйственных мероприятий (например, подготовка участков, способы рубки), проводимых в соответствии с высшими достижениями лесоводственной науки или законодательством, направленным на сохранение почвенных ресурсов
	5.2.1	MP	Area and percent of forest land with significant soil degradation	Площадь и доля лесных земель со значительной деградацией почвы
5.3 WATER PROTECTION	5.3.1	MP	Proportion of forest management activities that meet best management practices, or other relevant legislation, to protect water related resources	Доля лесохозяйственных мероприятий, проводимых в соответствии с высшими достижениями лесоводственной науки или законодательством, направленным на сохранение водных ресурсов
	5.3.2	MP	Area and percent of water bodies, or stream length, in forest areas with significant change in physical, chemical or biological properties from reference conditions	Площадь и доля водных объектов или длина водных потоков в пределах лесных территорий со значительными изменениями физических, химических или биологических свойств по сравнению с фоновыми условиями
	5.3.3	LFCC	Area of forest protect for water harvesting	Площадь лесов, защищенных для сбора воды

	5.3.4	LFCC	Water level in forest zone	Уровень воды в лесной зоне
	5.3.5	ITTO	Protection of downstream catchment values at the landscape level	Защита ценности водосборов нижнего течения на уровне ландшафта
	5.4.1	ITTO	Soil productivity and water retention capacity in production forests	Производительность почвы и водоудерживающая способность в производственных лесах
	5.5.1	ITTO	Forest engineering for soil and water protection	Лесотехника по защите почв и воды

## 6. Socio-economic functions

The theme covers the contributions of forest resources to the overall economy and particularly also to a bioeconomy, supporting the shift from fossil-based towards a bio-based economy, both in wood consumption and energy use-related indicators, but also focussing on employment, values generated through processing and marketing of forest products or trade and investment in the forest sector. It also addresses the important forest function of hosting and protecting sites and landscapes of high cultural, spiritual or recreational value, and thus includes aspects of land tenure, indigenous and community management systems, and traditional knowledge.

Sub Group	No.	Ref.	Indicator in English	Название индикатора на русском
6.1 PRODUCTIVITY	6.1.1	LFCC	Productivity Index	Индекс продуктивности
	6.1.2	ITTO	Wood and non-wood forest product processing capacities and efficiency	Потенциал и эффективность обработки древесных и недревесных лесных продуктов
6.2 GROSS DOMESTIC PRODUCT	6.2.1	FE	Contribution of forestry and manufacturing of wood and paper products to gross domestic product	Вклад лесного хозяйства и производства древесины и бумаги в валовой внутренний продукт.
	6.2.2	ITTO	Contribution of the forest sector to gross domestic product	Вклад лесного хозяйства в валовом внутреннем продукте
	6.2.3	FRA	Revenues, expenditures and contribution of forestry to GDP	Доходы, расходы и участие лесного хозяйства в ВВП
	6.2.4	LFCC	Share of wood production in GDP	Доля производства древесины в ВВП
	6.2.5	LFCC	Share of non-wood products in GDP	Доля недревесных продуктов в ВВП
	6.2.6	LFCC	Share of forest related services in GDP	Доля услуг, связанных с лесом, в ВВП
6.3 Trade	6.3.1	LFCC	Production, Consumption, Import and export of wood products	Производство, потребление, импорт и экспорт изделий из дерева
	6.3.2	LFCC	Production, Consumption, Import and export of non-wood products	Производство, потребление, импорт и экспорт недревесных изделий
	6.3.3	FE	Imports and exports of wood and products derived from wood	Импорт и экспорт древесины и продукции, полученной из древесины
	6.3.4	MP	Value and volume in round wood equivalents of exports and imports of wood products	Стоимость и объем (в эквиваленте круглого леса) экспорта и импорта древесной продукции

	6.3.5	MP	Exports as a share of wood and wood products production and imports as a share of wood and wood products consumption	Экспорт как доля от производства древесины и древесной продукции и импорт как доля от потребления древесины и древесной продукции
6.4 REVENUE	6.4.1	LFCC	Return of capital	Возврат капитала
	6.4.2	FE	Net revenue of forest enterprises	Чистый доход лесных предприятий.
	6.4.3	MP	Revenue from forest-based ecosystem services	Доход от экологических услуг, предоставляемых лесом
	6.4.4	MP	Distribution of revenues derived from forest management	Распределение доходов, получаемых от лесного хозяйства
6.5 INVESTMENTS	6.5.1	FE	Total public and private investments in forests and forestry	Общие государственные и частные инвестиции в леса и лесное хозяйство.
	6.5.2	MP	Value of capital investment and annual expenditure in forest management, wood and non-wood forest product industries, forest-based ecosystem services, recreation and tourism	Объем капитальных инвестиций и ежегодных расходов на лесное хозяйство, производство древесной и недревесной продукции, предоставляемой лесом, экологические услуги, рекреацию и туризм
	6.5.3	MP	Annual investment and expenditure in forest-related research, extension and development, and education	Ежегодные инвестиции и расходы на исследования по лесной тематике и образование
	6.5.4	LFCC	Investment in R&D and forest education and industrial wood production	Инвестиции в исследования и разработки и лесное образование и производство промышленной древесины
	6.5.5	LFCC	Investment volume in forest growth, health, management, planted forest, wood processing and tourism	Объем инвестиций в рост, здоровье, управление лесов, посадку леса, переработку древесины и туризм
	6.5.6	LFCC	Investment in international forest sector	Инвестиции в международный лесной сектор
6.6 EMPLOYMENT	6.6.1	FE	Number of persons employed and labour input in the forest sector, classified by gender and age group, education and job characteristics	Число лиц, занятых в лесном секторе, и трудовые затраты в лесном секторе, классифицируемые по гендерным отношениям, возрастной группе, образованию и характеру выполняемой работы
	6.6.2	ITTO	Capacity building of the workforce in forest management and forest industry	Наращивание потенциала рабочей силы в управлении лесами и лесной промышленности
	6.6.3	FRA	Employment in forestry	Занятость в лесном хозяйстве
	6.6.4	MP	Employment in the forest sector	Занятость в лесном секторе
	6.6.5	LFCC	Employments	Занятость
6.7 WAGES	6.7.1	LFCC	Average income of main (jobs) working groups	Средний доход основных групп занятости
	6.7.2	MP	Average wage rates, annual average income and annual injury rates in major forest employment categories	Средние ставки заработной платы, ежегодный средний доход и ежегодный уровень травматизма по основным категориям занятости в лесном хозяйстве

6.8 DEPENDENCY	6.8.1	MP	Resilience of forest-dependent communities	Устойчивость зависимых от леса сообществ
	6.8.2	MP	Area and percent of forests used for subsistence purposes	Площадь и доля лесов, используемых для получения средств к существованию
6.9 WORK SAFETY	6.9.1	FE	Frequency of occupational accidents and occupational diseases in forestry	Частота несчастных случаев на производстве и профессиональных заболеваний в лесном хозяйстве
	6.9.2	ITTO	Procedures to ensure the health and safety of forest workers	Процедуры обеспечения здоровья и безопасности лесных рабочих
6.10 CONSUMPTION	6.10.1	FE	Consumption per head of wood and products derived from wood	Потребление древесины и продукции, полученной из древесины на душу населения
	6.10.2	MP	Total and per capita consumption of wood and wood products in round wood equivalents	Общее потребление и потребление на душу населения древесины и древесной продукции в эквиваленте круглого леса
	6.10.3	MP	Total and per capita consumption of non-wood forest products	Общее потребление и потребление на душу населения недревесной продукции
6.11 WOOD ENERGY	6.11.1	FE	Share of wood energy in total primary energy supply, classified by origin of wood	Доля энергии, получаемой из древесины, в общем предложении первичных источников энергии с классификацией по происхождению древесины
	6.11.2	MP	Avoided fossil fuel carbon emissions by using forest biomass for energy	Сокращение эмиссии углерода из ископаемого топлива за счет использования лесной биомассы для получения энергии
	6.11.3	LFCC	Percentage of energy usage of renewable forest resources, compare to total energy use	Процент использования энергии из восстанавливаемых лесных ресурсов в сравнении с общим энергопотреблением
6.12 RECREATION	6.12.1	FE	The use of forests and other wooded land for recreation in terms of right of access, provision of facilities and intensity of use	Использование лесов и других покрытых древесной растительностью земель для отдыха с точки зрения права на доступ, обеспечения надлежащих условий и интенсивности использования
	6.12.2	MP	Area and percent of forests available and/or managed for public recreation and tourism	Площадь и доля лесов, доступных и/или управляемых для рекреации и туризма
	6.12.3	MP	Number, type, and geographic distribution of visits attributed to recreation and tourism and related to facilities available	Число, тип и географическое распределение посещений, связанных с рекреацией и туризмом, отнесенное к доступным объектам
	6.12.4	LFCC	Availability and usage of recreation facilities	Доступность и использование баз отдыха
	6.12.5	LFCC	Variable usage of forest in social level	Варибельное использование леса на социальном уровне
	6.12.6	LFCC	Area and percentage of forest which has been managed for public recreation and tourism	Площадь и доля леса, управляемая для общественного отдыха и туризма

	6.12.7	LFCC	Number and type of facility in relation to the forest area and population which has been managed for public recreation and tourisms	Число и типы объектов, которые управлялись для общественного отдыха и туризма, в сравнении с лесными площадями и населением
	6.12.8	LFCC	Number of visitors in relation to the forest area and population to the areas which has been managed for public recreation and tourisms	Число посетителей в сравнении с лесной площадью и населения - с площадями, которые управлялись для общественного отдыха и туризма
	6.13.1	LFCC	Number and possibility of fishing and game	Число и возможность рыбной ловли и дичи
6.14 TRADITIONAL KNOWLEDGE AND CULTURAL VALUES	6.14.1	FRA	Ecosystem services, cultural or spiritual values	Экосистемные услуги, культурные и духовные ценности
	6.14.2	LFCC	Number of studies on traditional land use which employed in forest management	Число исследований традиционного землепользования, используемых в управлении лесом
	6.14.3	LFCC	Usage of traditional experiences, knowledge and technologies	Использование традиционного опыта, знаний и технологий
	6.14.4	MP	Local people income based upon traditional knowledge	Доходы местного населения, основанные на традиционном знании
	6.14.5	ITTO	Forests reserved for specific cultural, research or educational purposes	Леса, предусмотренные для конкретных культурных, исследовательских и образовательных целей
6.15 LOCAL COMMUNITIES	6.15.1	MP	The importance of forests to people	Важность лесов для людей
	6.15.2	ITTO	Local livelihoods and forest management	Местные условия жизни и управление лесами
	6.15.3	LFCC	Economic diversity in forest related communities	Экономическое разнообразие в общинах, связанных с лесом
	6.15.4	LFCC	Educational and training gained by forest related communities	Образование и переподготовка, получаемая общинами, связанными с лесом
	6.15.5	LFCC	Employment rate in forest related communities	Занятость в общинах, связанных с лесом
	6.15.6	LFCC	Number of low income people in forest related communities	Число людей с низким доходом в общинах, связанных с лесом
	6.15.7	ITTO	Recognition and value of forest-management knowledge and skills of local people	Признание и придание значения знаний и навыков местного населения, связанных с управлением лесом
	6.16.1	MP	Recovery or recycling of forest products as a percent of total forest products consumption	Повторно перерабатываемая лесная продукция как доля от общего объема потребления древесной продукции
6.17 CERTIFICATION	6.17.1	FRA	Forest Stewardship Council (FSC) certification	Сертификация Лесного попечительского совета (ЛПС)
	6.17.2	FRA	Programme for the Endorsement of Forest Certification (PEFC)	Программа подтверждения сертификации леса (ППСЛ)
	6.17.3	FRA	Domestic forest management certification	Внутренняя сертификация лесопользования

## 7. Legal, policy and institutional framework

The theme includes the legal, policy and institutional arrangements necessary to support the above six thematic elements, including participatory decision-making, governance and law enforcement, and monitoring and assessment of progress. It also involves broader societal aspects, including fair and equitable use of forest resources, scientific research and education, infrastructure arrangements to support the forest sector, transfer of technology, capacity-building, and public information and communication.

Some of the below indicators are of qualitative/descriptive nature.

Sub-Group	No.	Ref.	Indicator in English	Название индикатора на русском
7.1 NATIONAL FOREST PROGRAMME	7.1.1	FE	National Forest Programmes or equivalent	Национальные лесные программы или их эквиваленты
	7.1.2	MP	Programmes, services and other resources supporting the sustainable management of forests	Программы, сервисы и другие ресурсы, поддерживающие устойчивое управление лесами
	7.1.3	FRA	National platform, stakeholders, permanent forest land use and reporting	Национальная платформа, заинтересованные стороны, постоянное использование лесных земель и отчетывание
	7.1.4	ITTO	Integration of forests in national and subnational land-use planning	Интеграция лесов в национальное и субнациональное планирование лесопользования
7.2 MANAGEMENT PLAN	7.2.1	LFCC	Number of new and updated standards and guidelines of forest management with regard to the ecologic targets	Число новых и обновленных стандартов и методических рекомендаций по лесопользованию в предметах, связанных с экологией
	7.2.2	FRA	Forest management plan and monitoring	План лесопользования и мониторинг
	7.2.3	ITTO	Capacity and mechanisms for management planning & the periodic monitoring of implementation	Потенциал и механизмы планирования управления и периодического мониторинга реализации
	7.2.4	ITTO	Multiyear forest management plans in forest management units (FMUs)	Многолетние планы управления лесами в ЛХЕ
	7.2.5	ITTO	Long-term projections, strategies and plans for production permanent forest estates (PFE) and protection PFE	Долгосрочные прогнозы, стратегии и планы для разработки ПЛФ и защиты ПЛФ
7.3 INSTITUTIONAL FRAMEWORK	7.3.1	FE	Institutional frameworks	Организационная структура
	7.3.2	LFCC	Availability of suitable institutions and instruments	Наличие соответствующих институтов и инструментов
	7.3.3	ITTO	Institutions responsible for, and supportive of, forest management	Институты, ответственные за и поддерживающие управление лесами
	7.3.4	ITTO	Availability of professional and technical personnel to perform and support forest management	Наличие профессиональных и технических кадров для осуществления и поддержки управления лесами

7.4 LEGAL FRAMEWORK	7.4.1	FRA	Legislation and regulations supporting SFM	Законодательство и нормативно-правовые акты, поддерживающие УЛП
	7.4.2	FE	Legal/regulatory framework: National (and/or sub-national) and International commitments	Правовая/нормативная база: национальные (и/или субнациональные) и международные обязательства
	7.4.3	MP	Enforcement of laws related to forests	Обеспечение правопорядка, относящегося к лесам
	7.4.4	MP	Legislation and policies supporting the sustainable management of forests	Юридические и политические основы для устойчивого управления лесами
	7.4.5	LFCC	Implementing laws in different levels and possibility of evaluations	Реализация законов на различных уровнях и возможность оценки
	7.4.6	LFCC	Capabilities of implementing, related international laws	Потенциал по реализации соответствующих международных законов
	7.4.7	LFCC	Acceptance (follow up) of law, regulation and management rules in relation to SFM	Принятие (прослеживание) законов, нормативно-правовых актов и правил управления, связанных с УЛП
	7.4.8	LFCC	Local acceptance (follow up) of standard law related to the soil erosion	Принятие (прослеживание) местного стандартного закона, связанного с эрозией почвы
	7.4.9	LFCC	Local acceptance of soil erosion in relation to the road construction or river sinuosity	Признание на местном уровне эрозии почвы, связанной со строительством дорог и реками
7.5 ECONOMIC INSTRUMENTS	7.5.1	FE	Financial and economic instruments	Финансовые и экономические инструменты
	7.5.2	LFCC	Economic and financial framework and instruments	Экономические и финансовые рамки и инструменты
	7.5.3	ITTO	National, subnational and international public and private funding committed to SFM	Национальное, субнациональное и международное государственное и частное финансирование, предусмотренное для УЛП
	7.5.4	ITTO	Mechanisms for the equitable sharing of the costs and benefits of forest management	Механизмы равноправного распределения затрат и выгод управления лесами
	7.5.5	ITTO	Incentives to encourage SFM	Стимулы для поощрения УЛП
	7.5.6	MP	Taxation and other economic strategies that affect the sustainable management of forests	Таксация и другие экономические стратегии, влияющие на устойчивое управление лесами
	7.5.7	LFCC	Distribution of financial benefits of industries wood productions	Распределение финансовых выгод индустрии производства изделий из дерева
7.6 INFORMATION	7.6.1	LFCC	Social informative and advisory instruments	Социально-информативные и консультативные инструменты
	7.6.2	FE	Information and communication	Информация и связь
	7.6.3	LFCC	Level of confidence regarding the collected forest-related data i(coverage, reliability, replicability)	Охват, реальность, репликация, уровень доверия связанных с лесом собранных данных

	7.6.4	LFCC	Availability of forest related data to the people	Доступность связанных с лесом данных для населения
	7.6.5	LFCC	Research and extension capacities	Потенциал для исследований и распространения знаний
7.7 ASSESSMENT	7.7.1	FRA	Methods measuring progress towards SFM	Методы измерения прогресса в направлении УЛП
	7.7.2	MP	Monitoring, assessment and reporting on progress towards sustainable management of forests	Мониторинг, оценка и отчет о прогрессе в достижении устойчивого управление лесами
	7.7.3	MP	Development and application of research and technologies for the sustainable management of forests	Развитие и применение науки и технологий для устойчивого управление лесами
7.8 STAKEHOLDER INVOLVEMENT	7.8.1	MP	Cross-sectoral policy and programme coordination	Межотраслевая политика и координация программ
	7.8.2	MP	Partnerships to support the sustainable management of forests	Партнерства для поддержки устойчивого управление лесами
	7.8.3	MP	Public participation and conflict resolution in forest-related decision making	Участие общественности и разрешение конфликтов при принятии решений в лесной сфере
	7.8.4	FRA	Stakeholder involvement at operational scale	Вовлечение заинтересованных сторон на операционном уровне
	7.8.5	ITTO	Stakeholder participation in land-use & forest management planning, monitoring and assessment	Участие заинтересованных сторон планировании, мониторинге и оценке землепользования и управления лесами
	7.8.6	LFCC	Percentage of forest area designed (programmed), managed and implemented by people participation	Доля лесной площади, планируемой, управляемой и осуществляемой при участии населения
	7.8.7	LFCC	Stakeholder participation in SFM process	Группы (сектора), удовлетворенные от участия гражданского общества в процессе УЛП
	7.8.8	LFCC	Increase of local people partnership in development of policies, implementation and agreement of SFM	Развитие сотрудничества с местным населением в разработке политик, осуществлении и согласовании УЛП
	7.8.9	LFCC	Protect of the local people right in legal agreement, commitment and program processing in SFM	Защита прав местного населения при обработке правовых соглашений, обязательств и программ в УЛП
	7.8.10	ITTO	Mechanisms for resolving disputes between forest stakeholders	Механизмы разрешения споров между заинтересованными сторонами лесного сектора
7.9 POLICIES	7.9.1	FRA	Policies supporting SFM	Политики, поддерживающие УЛП
	7.9.2	ITTO	Policies, laws and regulations for governing forests	Политики, законы и нормативно-правовые акты по управлению лесов
	7.9.3	ITTO	Forest governance	Управление лесами
	7.9.4	LFCC	Availabilities of policies, laws and suitable regulations in national and regional level	Наличие политик, законов и соответствующих нормативно-правовых актов на национальном и региональном уровнях

	7.9.5	FE	Policies, institutions and instruments to maintain and appropriately enhance forest resources and their contribution to global carbon cycles	Политика, учреждения и инструменты для поддержания и надлежащего приумножения лесных ресурсов и их вклада в глобальный цикл углерода
	7.9.6	FE	Policies, institutions and instruments to maintain forest ecosystem health and vitality	Политика, учреждения и инструменты для поддержания санитарного состояния и жизнеспособности лесных экосистем
	7.9.7	FE	Policies, institutions and instruments to maintain and encourage the productive functions of forests	Политика, учреждения и инструменты для поддержания и повышения продуктивных функций лесов
	7.9.8	FE	Policies, institutions and instruments to maintain, conserve and appropriately enhance the biological diversity in forest ecosystem	Политика, учреждения и инструменты для поддержания, сохранения и надлежащего улучшения биологического разнообразия в лесных экосистемах
	7.9.9	FE	Policies, institutions and instruments to maintain and appropriately enhance of the protective functions in forest management	Политика, учреждения и инструменты для поддержания и надлежащего улучшения защитных функций в управлении лесами
	7.9.10	FE	Policies, institutions and instruments to maintain other socio-economic functions and conditions	Политика, учреждения и инструменты для поддержания других социально-экономических функций и условий
7.10 OWNERSHIP	7.10.1	FE	Number of forest holdings, classified by ownership categories and size classes	Количество лесовладений, классифицированных по категориям собственности и размерам.
	7.10.2	FRA	Forest ownership	Владение лесами
7.11 TENURE RIGHTS	7.11.1	MP	Clarity and security of land and resource tenure and property rights	Ясность и гарантированность права собственности на землю и ресурсы
	7.11.2	ITTO	Forest tenure and ownership	Владение и собственность лесов
	7.11.3	ITTO	Tenure and user rights of indigenous peoples & local communities over publicly owned forests	Права коренных народов и местных общин по владению и пользованию лесами, находящимися в государственной собственности
	7.11.4	LFCC	Forest area under local people management	Площадь леса, управляемого местным населением
	7.11.5	ITTO	Involvement of indigenous peoples and local communities in forest management	Участие коренных народов и местных общин в управлении лесами
7.12 Concession	7.12.1	LFCC	Concessions to local people	Роялти местного населения в индустрии производства изделий из дерева
	7.12.2	ITTO	Timber harvesting arrangements in natural production forests	Механизмы заготовки древесины в естественных производственных лесах
7.13 Control	7.13.1	ITTO	Forest product tracking systems or similar control mechanisms	Системы слежения лесных продуктов или аналогичные механизмы контроля

	7.13.2	ITTO	Historical records on the extent, nature and management of forests	Исторические данные по площади, природе и управлению лесов
	7.14.1	ITTO	Silvicultural management in planted forests	Управления лесоводства в лесонасаждениях
	7.15.1	ITTO	Strategic monitoring of silvicultural systems in natural and planted forests	Стратегический мониторинг лесокультурных систем в естественных и посаженных лесах
	7.16.1	LFCC	Forest areas and time of wood production	Площадь лесов и время производства изделий из дерева
7.17 Pro- jects	7.17.1	LFCC	Forestry project	Лесные исследовательские проекты
	7.17.2	LFCC	Forestry research project and percentage of coverage areas	Лесные проекты и процент покрытых площадей
	7.18.	LFCC	Partnership in Climate Change Convention and other related issue in forest sector	Партнерство в Конвенции об изменении климата и других соответствующих вопросах, связанных с лесным сектором
	7.19.1	LFCC	Cooperation with other countries in forest monitoring (data collecting) and reporting on C&I for SFM	Сотрудничество с другими странами в мониторинге лесов (сбор данных) и отчетности по КиИ для УЛП
7.20 NEW TECHNOLOGY	7.20.1	LFCC	Extension and usage of improved new technology	Распространенность и использование улучшенных новых технологий
	7.20.2	LFCC	Transfer and usage of suitable (environmentally sound) technologies	Передача и использование соответствующих (экологически безопасных) технологий
	7.20.3	LFCC	Technology and new capacity to evaluate social-economic consequences of implementation of new technologies	Технологии и новый потенциал по оценке социально-экономических последствий использования новой технологии

## Documents, links & contacts

Recommended reading for further specific indicator-related questions on measurement units and reporting notes and contact persons:

Process	Website	Documents / Links	Contact persons
Montréal Process	<a href="http://www.montrealprocess.org">www.montrealprocess.org</a> <a href="https://www.montrealprocess.org/Resources/Criteria_and_Indicators/index.shtml">https://www.montrealprocess.org/Resources/Criteria_and_Indicators/index.shtml</a>	<p><a href="#">The Montréal Process, Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests, Sep. 2015</a></p> <p>At a Glance -<a href="#">Montréal Process Criteria and Indicators Poster</a></p> <p><a href="#">Montréal Process Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests TECHNICAL NOTES , July 2014</a></p>	<p>Maria Palenova, <a href="mailto:palenova@gmail.com">palenova@gmail.com</a> (Russian speaking)</p> <p>Guy Robertson, <a href="mailto:Grobertson02@fs.fed.us">Grobertson02@fs.fed.us</a></p> <p>Irina Vukolova, <a href="mailto:exp.05@list.ru">exp.05@list.ru</a> (Russian speaking)</p>
Forest Europe (FE)	<a href="http://foresteurope.org">http://foresteurope.org</a>	<p>Updated Pan-European indicators for Sustainable forest Management, <a href="http://foresteurope.org/wp-content/uploads/2016/11/III.-ELM_7MC_2_2015_MinisterialDeclaration_adopted-2.pdf#page=5">http://foresteurope.org/wp-content/uploads/2016/11/III.-ELM_7MC_2_2015_MinisterialDeclaration_adopted-2.pdf#page=5</a></p> <p>Background Information, <a href="http://foresteurope.org/wp-content/uploads/2016/10/3AG_UPI_Updated_Backgr_Info.pdf">http://foresteurope.org/wp-content/uploads/2016/10/3AG_UPI_Updated_Backgr_Info.pdf</a></p> <p>Terms &amp; Definitions, <a href="http://foresteurope.org/wp-content/uploads/2017/02/3AG_UPI_Updated_Terms_Definitions.pdf">http://foresteurope.org/wp-content/uploads/2017/02/3AG_UPI_Updated_Terms_Definitions.pdf</a></p>	<p>Stefanie Linser, <a href="mailto:Stefanie.linser@efi.int">Stefanie.linser@efi.int</a>;</p> <p>Rastislav Rasi, <a href="mailto:rastislav.rasi@foresteurope.org">rastislav.rasi@foresteurope.org</a></p> <p>Mati Valgepea, <a href="mailto:mati.valgepea@envir.ee">mati.valgepea@envir.ee</a> (Russian speaking)</p> <p>Maria Palenova, <a href="mailto:palenova@gmail.com">palenova@gmail.com</a> (Russian speaking)</p>
Low Forest Cover Countries (LFCC)	No information in Russian or English		Mostafa Jafari, <a href="mailto:mostafajafari@libero.it">mostafajafari@libero.it</a>
International Tropical Timber Organization (ITTO)	<a href="http://www.itto.int/">http://www.itto.int/</a>	<p>Criteria and indicators for the sustainable management of tropical forests</p> <p><a href="#">ITTO PD 21 (E) Web</a></p> <p><a href="#">User-friendly C&amp;I reporting format</a></p>	Steven Johnson, <a href="mailto:johnson@itto.int">johnson@itto.int</a>
FAO Global Forest Resources Assessment (FRA)	<p>En: <a href="http://www.fao.org/forest-resources-assessment/en/">http://www.fao.org/forest-resources-assessment/en/</a></p> <p>Ru: <a href="http://www.fao.org/forest-resources-assessment/ru/">http://www.fao.org/forest-resources-assessment/ru/</a></p>	<p>FRA Desk Reference</p> <p>En: <a href="http://www.fao.org/3/a-i4808e.pdf">http://www.fao.org/3/a-i4808e.pdf</a></p> <p>Ru: <a href="http://www.fao.org/3/a-i4808r.pdf">http://www.fao.org/3/a-i4808r.pdf</a></p> <p>FRA Terms &amp; Definitions</p> <p>En: <a href="http://www.fao.org/docrep/017/ap862e/ap862e00.pdf">http://www.fao.org/docrep/017/ap862e/ap862e00.pdf</a></p> <p>Ru: <a href="http://www.fao.org/docrep/017/ap862e/ap862e00.pdf">http://www.fao.org/docrep/017/ap862e/ap862e00.pdf</a></p>	Anssi Pekkarinen, <a href="mailto:FRA@fao.org">FRA@fao.org</a>

## **Annex 3:**

### **Advanced considerations**

#### **Subsets of forest related indicators to address specific policy issues**

##### ***Background***

In autumn 2013, an EFI study confirmed that the approach taken by the pan-European set of indicators for SFM is balanced and comprehensive (Wolfslehner et al., 2013). To address specific policy issues, it may be desirable to use a subset of the indicators to measure progress or to set goals, even to manage trade-offs. It may only be necessary to use these subsets in certain regions or countries, or for a limited time or purpose depending on emerging issues or changing needs.

The EFI Study together with the findings of a European Commission's Standing Forestry Committee Ad hoc Working Group on sustainable forest management criteria and indicators (EC, 2015) showed that data from SFM indicators are not well known or used by other national, regional and international sectors (e.g. energy, biodiversity) or by broader indicator sets applied to the whole of society. This is because information for the forest sector indicators is not in a form that is easily used or understood by the other sectors. By the same token, information from other sectors is rarely used by the forest sector, as the data are not sector-specific but tend to be for the whole economy or for the environment, rural development of which the forest sector may be only one part.

To remedy this, consider the institutions, organizations or processes that may wish to have specific forest indicator information, when developing indicators. Design the indicator set with this in mind. Identify which subsets are relevant to specific policy challenges or emerging issues as this may help to build bridges with other sectors.

When working up a national C&I set, consider the application of SDGs at the global level and FRA reporting at the regional level for the CFRQ (46 FOREST EUROPE MS).

##### ***Forest-related indicators relevant for other institutions, organizations or processes***

Forest-related indicators could be particularly relevant to UNFCCC, UNCCD, CBD and the European Union for the following topics, which later sections explain in more detail below:

- Rural development
- Environment & Biodiversity
- Resilience
- Climate change mitigation and adaptation
- Energy
- Bioeconomy
- Sub-set of key or headline indicators

## Rural Development

Rationale for indicator selection: Rural development aims to help rural areas meet the wide range of economic, environmental and social challenges of the 21st century. Forests are a major natural resource in rural areas, in many countries providing not only biomass but also employment, cultural identity, and a range of ecosystem services. To demonstrate the contribution of forests to rural development, the subset indicators report on structural trends of both, forests and people working in and being affected by forests. This implies knowledge about the extent of forests available for wood supply, and the revenue from sales of wood and non-wood products and services.

<b>Non-exhaustive list of possible indicators for a subset of forest-related rural development indicators - Thought starter</b>	<b>Source</b>
Forest and other wooded land area, incl. change	Montréal Process Ind. 1.1.a, FOREST EUROPE Ind.1.1, LFCC Ind. 1-1-1, ITTO Ind. 2.6, AICHI Ind./Target 5, SDG Ind. 15.1.1 and part of 15.2.1, GCS 1,
Area and percent of forest land and net area of forest land available for wood production	Montréal Process Ind. 2a
Protected forest areas	Montréal Process Ind. 1.1.b, LFCC Ind. 1-1-5, FOREST EUROPE Ind. 4.9 & CMEF <sup>5</sup> context indicator, SDG Ind. 15.2.1
Employment in the forest sector	Montréal Process Ind. 6.3.a, LFCC Ind. 5-3-5, ITTO Ind. 1.5 FOREST EUROPE Ind. 6.5
Employment rate in forest-related communities	LFCC Ind. 6-3-3
Labour productivity in forestry	Eurostat Ind.
Resilience of forest-dependent communities	Montréal Process Ind. 6.3.c
Production of renewable energy from forestry	CMEF context indicator
Energy use in agriculture, forestry and food industry	CMEF context indicator
Value of capital investment and annual expenditure in forest management, wood and non-wood forest product industries, forest based environmental services, recreation, and tourism	Montréal Process Ind. 6.2.a
Land take	LFCC Ind. 2-2, EEA, CSI 014, <a href="http://www.eea.europa.eu/data-and-maps/indicators/land-take-2/assessment-2">http://www.eea.europa.eu/data-and-maps/indicators/land-take-2/assessment-2</a>
Area and percent of forests available and/or managed for public recreation and tourism	Montréal Process Ind. 6.4.a, LFCC Ind. 6-6-3
Net revenue	Montréal Process Ind. 6.1.c, LFCC Ind. 5-3-3, FOREST EUROPE Ind. 6.3
National Forest Programmes or equivalent	FOREST EUROPE Ind. 1
Land use change	Partly FOREST EUROPE Ind. 1.1, Partly FOREST EUROPE Ind. 2.5

<sup>5</sup> Common Monitoring and Evaluation Framework Rural Development Indicators, [http://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-previous/2007-2013/docs/note\\_f\\_en.pdf](http://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-previous/2007-2013/docs/note_f_en.pdf)

	Eurostat LUCAS EEA CSI 014 ( <a href="https://www.eea.europa.eu/data-and-maps/indicators/land-take-2/assessment-1">https://www.eea.europa.eu/data-and-maps/indicators/land-take-2/assessment-1</a> )
Ownership structure	FOREST EUROPE Ind. 6.1, COST Action FACESMAP on forest ownership ( <a href="http://www.unece.org/index.php?id=35449">http://www.unece.org/index.php?id=35449</a> )
Investment in forests and forestry	FOREST EUROPE Ind. 6.4, Montréal Process Ind. 6.2, LFCC Ind. 5-1-10, 5-4-1, 6-5-3
Contribution of forest sector <sup>6</sup> to GDP	FOREST EUROPE Ind. 6.2, LFCC Ind. 5-1-1, 5-1-4, 5-1-7

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<sup>6</sup> In accordance with Eurostat the “forest sector” comprises “Forestry and the wood-based industry”.

## Environment & Biodiversity

Rationale for indicator selection: Forests are the most biodiverse of all terrestrial ecosystems. Sustainable forest management is the forest sector<sup>7</sup>'s global response to sustainable development. It requires the stewardship and use of forests in such a way, and at such a rate, that it secures all the functions of the forested, including the maintenance and enhancement of biodiversity.

There is widespread concern about the global decline of forests and how this impacts biodiversity. There is a need, therefore, for indicators that report on biodiversity using measures based on the structure, composition and function of forests. This would require a basic understanding of how size and forest structure affect the capability of forest habitats to support biodiversity. Most of the chosen indicators express structure and function characteristics as proxies for biodiversity based on a stand structure approach. This makes the assumption that a more complex structure will support greater biodiversity. It may also show how forest management can go hand in hand with improving biodiversity through measures such as leaving deadwood to accumulate, conserving genetic diversity, protecting forest areas and responding to the many pressures that forests face, e.g. invasive alien species, pathogenic organisms.

<b>Non-exhaustive list of possible indicators for a subset of forest-related <u>environment/ biodiversity</u> indicators - Thought starter</b>	<b>Source</b>
Tree species composition	FOREST EUROPE Ind. 4.1
Forest area	LFCC Ind. 1-1-1, Montréal Process Ind. 1.1a, 2.a, FOREST EUROPE Ind. 1.1, ITTO Ind. 2.2, 2.6, SDG Ind 15.1.1 and part of SDG Ind.15.2.1, AICHI Ind./Target 5, GCS 1,
Regeneration	FOREST EUROPE Ind. 4.2, LFCC Ind 1-2-6
Naturalness	FOREST EUROPE Ind. 4.3
Introduced tree species	LFCC Ind. 1-2-4, FOREST EUROPE Ind. 4.4, part of EEA SEBI 010 and CBD Ind.
Deadwood	FOREST EUROPE Ind. 4.5, EEA SEBI 018
Invasive alien species	Part of FOREST EUROPE Ind. 4.4, Montréal Process Ind. 3.a, LFCC 1-2-4
Genetic resources	FOREST EUROPE Ind. 4.6, Montréal Process Ind. 1.3.c, LFCC Ind. 1-3-1+2, ITTO Ind. 5.5
Number of native forest associated species	Montréal Process Ind. 1.2.a, LFCC Ind. 1-2-4
Fragmentation	Montréal Process Ind. 1.1.c, FOREST EUROPE Ind. 4.7, part of EEA SEBI 013 and CBD Ind.
Threatened forest species	FOREST EUROPE Ind. 4.8, Montréal Process Ind. 1.2.b, LFCC Ind. 1-2-1, ITTO Ind. 5.3, also part of CBD Ind.
Trends in abundance and distribution of selected species	EEA SEBI 001, CBD Ind., UNCCD Ind. So3-2, <a href="http://www.unccd.int/en/programmes/Science/Monitoring-Assessment/Pages/Impact-Indicators.aspx">http://www.unccd.int/en/programmes/Science/Monitoring-Assessment/Pages/Impact-Indicators.aspx</a>
Number of threatened forest biotope types	Proposal from FOREST EUROPE Goals and 2020 Target Report (could also be added under Ind. 4.8)

<sup>7</sup> In accordance with Eurostat the "forest sector" comprises "Forestry and the wood-based industry".

Protected forests	Montréal Process Ind. 1.1.b, LFCC Ind. 2-9, ITTO Ind. 5.1, FOREST EUROPE Ind. 4.9, also part of EEA SEBI 007, CBD Ind., SDG 15.2.1 Ind.
Natura 2000 forest area	<i>DG Env</i> <a href="http://ec.europa.eu/environment/nature/natura2000/index_en.htm">http://ec.europa.eu/environment/nature/natura2000/index_en.htm</a> EEA SEBI 008 (Sites designated under the EU Habitats and Birds Directives)
Ecological Footprint	EEA, SEBI 023, <a href="http://www.eea.europa.eu/data-and-maps/indicators/ecological-footprint-of-european-countries/ecological-footprint-of-european-countries-2">http://www.eea.europa.eu/data-and-maps/indicators/ecological-footprint-of-european-countries/ecological-footprint-of-european-countries-2</a> , AICHI Ind., CBD Ind.
Red List Index	EEA SEBI 002, IUCN, AICHI Ind.
Mountain Green Cover Index	FAO, SDG 15.4 Ind, AICHI Ind.

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### ***Climate change mitigation, adaptation and resilience***

Rationale for indicator selection: An essential element in the climate change debate is about the contribution that forests could make to mitigating the effects of climate change. Forests can be a carbon sink or source, depending on circumstances and time horizons. The potential mitigation effects may extend beyond forest boundaries and carbon sequestration by trees. Wood products, fibre and bioenergy all offer scope for long-term carbon fixation and substitution of fossil-based fuels and materials.

Concern is increasing about the resilience of forests to the impacts of climate change e.g. droughts, storms, forest fires, and the spread of pathogens. Maintaining forests' resilience to recover from disturbances and to cope with climate change will almost certainly require active adaptation measures, including modified forest management and active institutional support, which will need to be adequately funded.

<b>Non-exhaustive list of possible indicators for a subset of forest-related <u>climate change mitigation, adaptation</u> and resilience indicators - Thought starter</b>	<b>Source</b>
Forest damage	FOREST EUROPE Ind. 2.4, Montréal Process Ind. 3.a+b
Forest degradation	FOREST EUROPE Ind. 2.5, LFCC Ind. 1-1-4, ITTO Ind. 3.4, part of SDG 15.3 Ind.
Growing stock	FOREST EUROPE Ind. 1.2, Montréal Process Ind. 2.b
Carbon stock	FOREST EUROPE Ind. 1.4, Montréal Process Ind. 5a+b, LFCC Ind. 4-1, ITTO Ind. 2.8+4,4 also AICHI Ind. and UNCCD Ind SO3-1, <a href="http://www.unccd.int/en/programmes/Science/Monitoring-Assessment/Pages/Impact-Indicators.aspx">http://www.unccd.int/en/programmes/Science/Monitoring-Assessment/Pages/Impact-Indicators.aspx</a> Reports of GHG inventories from Countries to UNFCCC/ Kyoto Protocol
Avoided fossil fuel carbon emissions by using forest biomass for energy	Montréal Process Ind. 5.c
Net GHG emissions (source)/removals (sink) of forests, and carbon balance of harvested wood products	IPCC, Global Core Set of Indicators 3
Naturalness	FOREST EUROPE Ind. 4.3
Introduced tree species	FOREST EUROPE Ind.4.4
Forest resilience and climate change adaptation	ITTO Ind. 3.3
Wood consumption	FOREST EUROPE Ind. 6.7, Montréal Process Ind. 6.1.d
Energy from wood resources	FOREST EUROPE Ind. 6.9
Electricity generated from renewable (wood) sources	Eurostat Tsien 050
Share of (wood) renewables in gross final energy consumption	Eurostat SDI & EEA, ENER 028
Recovery or recycling of forest products as a percent of total forest products consumption	Montréal Process Ind. 6.1.i

Public financial support and investments for forest adaptation	FOREST EUROPE qualitative ind.
Forest Land Footprint	Footprintnetwork.org
Forest composition and distribution	EEA, CLIM 034, <a href="http://www.eea.europa.eu/data-and-maps/indicators/forest-growth-2/assessment">http://www.eea.europa.eu/data-and-maps/indicators/forest-growth-2/assessment</a>
Resource efficiency of biomass use	OECD Green Growth ind.

### **Forests and water**

Rationale for indicator selection: Forests depend on water and play a vital role in maintaining water quality and regulating water flows. The way forests are managed is key to the quality of potable water, to protecting against natural hazards, such as flooding, and to ensuring continued productivity of the land. With rising global demand for freshwater and water shortages becoming more common, it is more important than ever to maintain healthy ecosystems. Studies over decades have confirmed the essential role of forests in hydrology and recognized this as one of the most important ecosystem services that sustainably-managed forests provide.

<b>Non-exhaustive list of possible indicators for a subset of <u>forest-and water</u> indicators - Thought starter</b>	<b>Source</b>
Forest area	LFCC Ind. 1-1-1, Montréal Process Ind. 1.1a, 2.a, FOREST EUROPE Ind. 1.1, ITTO Ind. 2.2, 2.6, SDG Ind 15.1.1 and part of SDG Ind.15.2.1, AICHI Ind./Target 5, GCS 1
Soil water content	FAO, <a href="http://www.fao.org/docrep/r4082e/r4082e03.htm">http://www.fao.org/docrep/r4082e/r4082e03.htm</a>
Impact of forest management and harvesting on the small water systems, lakes and rivers/groundwater and on the nutrient balance of soil	Partly Eurostat, FAO Aquastat
Protective forests – soil, water and other ecosystem services	FOREST EUROPE Ind. 5.1
Soil erosion by water – area eroded by more than 10 t/ha/year	Eurostat - Part of EU Resource Efficiency Scoreboard
Change in the extent of water-related ecosystems over time	SDG ind. 6.6.1 Custodian Agency UNEP

## Energy

Rationale for indicator selection: Solid and gaseous biomass, notably fuelwood, co-products from wood processing industries and recycled wood, which may be used for heating/cooling or to produce electricity, are major sources of renewable energy.

To meet growing demand for forest biomass for energy and other purposes, may require more intensive wood production from forests. Some countries already depend heavily on woody biomass imports. Without a sustainable approach, this could lead to forest degradation with negative impacts on biodiversity and ecosystem services, including the carbon pool.

<b>Non-exhaustive list of possible indicators for a subset of forest-related <u>energy</u> indicators - Thought starter</b>	<b>Source</b>
Relative share of wood energy sources	Joint Wood Energy Enquiry (JWEE) <a href="http://www.unece.org/forests/jwee.html">http://www.unece.org/forests/jwee.html</a>
Relative share of wood energy uses	JWEE
Share of woody biomass	JWEE, SDG 15.2.1 Ind. (Above-ground biomass stock in forest)
Woody biomass's share of domestic energy consumption	JWEE
Share of imports in wood fuel supply	JWEE
Trade in wood	FOREST EUROPE Ind. 6.8, Montreal Process Ind. 6.1.h, LFCC Ind. 5-1-3
Energy from wood resources	FOREST EUROPE Ind. 6.9
Electricity generated from renewable [wood] sources	Eurostat Tsien 050
Renewable energy share in the total final energy consumption	SDG ind. 7.2.1 Eurostat t2020_31 EEA CSI 048, ENER 028 <a href="http://www.eea.europa.eu/data-and-aps/indicators/#c5=&amp;c7=all&amp;c0=10&amp;b_start=0">http://www.eea.europa.eu/data-and-aps/indicators/#c5=&amp;c7=all&amp;c0=10&amp;b_start=0</a>
Availability and use of [woody] biomass resources for energy purposes	EU Renewable Energy Directive, Article 22 reporting, <a href="http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32009L0028&amp;from=en">http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32009L0028&amp;from=en</a>
Increment and fellings	FOREST EUROPE Ind. 3.1
Deadwood	FOREST EUROPE Ind. 4.5, EEA SEBI 018

## Bioeconomy

Rationale for indicator selection: The role of forests in a bioeconomy is to support the shift from a fossil-based economy to a bio-based economy, in terms of material and energy use. This implies the targeted and efficient use of forest resources, safeguarding sustainability. Related indicators can help to avoid unwanted impacts and support successful and sustainable bioeconomy development.

<b>Non-exhaustive list of possible indicators for a subset of forest-related <u>bioeconomy</u> indicators</b> <b>- Thought starter</b>	<b>Source</b>
Employment / forest sector workforce	LABOURSTA of ILO, Montréal Process Ind. 6.3.a, LFCC Ind. 5-3-5, ITTO Ind. 1.5 FOREST EUROPE Ind. 6.5
Resource use [wood] -Primary production of [woody] biomass -Import of [woody] biomass -Global land use for [woody] biomass-based consumption	Montréal Process Ind. 2.d and 6.1.f COMEXT data, used for JFSQ, EUROSTAT, FAO AGMEMOD database, UNCOMTRADE database EFI Forest Products Trade Flow Database
Resource productivity -Ratio between GDP and domestic material consumption (DMC)	LFCC Ind. 5-3-4, ITTO Ind. 7.1 Eurostat SDI Headline Ind <small>tsdpc100 http://ec.europa.eu/eurostat/cache/metadata/DE/tsdpc100_esmsip.htm</small> Also lead indicator in the EU Resource Efficiency Scoreboard. Data so far not specific for the forest sector
Resource and materials efficiency -material and recycling and recovery rates -materials leaving the economy (landfill, incineration without energy recovery) -renewable energy -water re-use and recycling	OECD Green Growth Ind. Montréal Process Ind. 6.1.i
Contribution of forest sector to GDP	FOREST EUROPE Ind. 6.2, LFCC Ind. 5-1-1, 5-1-4, 5-1-7
Increment and fellings	FOREST EUROPE Ind. 3.1
Harvested wood products	Part of FOREST EUROPE Ind. 6.7 wood consumption
Wood energy	Joint Wood Energy Enquiry (JWEE), FOREST EUROPE Ind. 6.9
Trade in wood (Imports/Exports)	FOREST EUROPE Ind. 6.8, Montreal Process Ind. 6.1.h, LFCC Ind. 5-1-3
Eco-innovation index	Eurostat, EU Innovation survey, Resource Efficiency Scoreboard

## Subsets of key or headline indicators

### **Subset of the pan-European indicators for SFM**

Discussions during the FOREST EUROPE indicator improvement process in 2014/15 and within the Standing Forestry Committee Ad hoc Working Group on sustainable forest management criteria and indicators concluded that a sub-set of key indicators could make it easier to explain what SFM is to the wider public. A simplified sub-set of key indicators would not remove the need for reporting on the complete set of indicators.

The following key indicators (from the complete set of FOREST EUROPE indicators) have been proposed to assist communication (EC, 2015):

<b>HORIZONTAL (ec-env-soc)</b>	<ul style="list-style-type: none"><li>- Forest area</li><li>- Growing stock</li><li>- Increment and fellings</li><li>- Forests under management plan or equivalent instruments</li><li>- Protective forests</li></ul>
<b>ENVIRONMENTAL</b>	<ul style="list-style-type: none"><li>- Forest damage</li><li>- Carbon stock</li><li>- Protected forests</li><li>- Deadwood</li><li>- Tree species composition</li></ul>
<b>SOCIO-ECONOMIC</b>	<ul style="list-style-type: none"><li>- Net revenue</li><li>- Workforce</li><li>- Bioenergy production</li><li>- Wood consumption</li><li>- Trade in wood</li></ul>

### **Global subset of indicators for SFM**

There is ongoing discussion of key forest indicators at the global level. The process began at the World Forestry Congress in Durban in September 2015. Discussions continued in a workshop in Ottawa, Canada in April 2016 and resulted in an Organization-Led Initiative (OLI) by the Collaborative Partnership on Forests (CPF) in Rome in November 2016. The OLI produced a first draft core set for wider consultation and proposed setting up a task force to develop and revise this taken into account comments received. The UNFF12 recognized this work in resolution E/2017/42 noting that *“the ongoing work led by the Collaborative Partnership on Forests to develop a set of global forest indicators, in particular on sustainable forest management, for use in assessing progress on the global forest goals and targets set out in the strategic plan, the forest-related targets of the Sustainable Development Goals and other international forest-related commitments, and invites the Partnership to present its proposal for consideration by the Forum at its thirteenth session, to be held in May 2018”*.

An online consultation in May 2017 together with discussions during the FRA 2020 Expert Consultation in Joensuu, Finland in June 2017 collected more stakeholder views on the proposal. In December 2017, the Task Force reviewed all the comments and finalized a draft Global Core Set, which it submitted to the CPF in February 2018 for approval. The UNFF13 Omnibus Resolution in May 2018 acknowledged the Global Core Set as follows:

*“The United Nations Forum on Forests, 11 Welcomes the progress made in developing a global core set of forest-related indicators aligned with the seven thematic elements of SFM and acknowledges the value of a core set in assessing progress towards achieving the GFGs and targets and other internationally-agreed forest-related goals and targets and in better focusing data collection efforts to*

reduce duplication; 12. Encourages members of the CPF and other relevant bodies to utilize the indicators of the global core set as appropriate and requests FAO and its partners to conduct further work in this area;”

### Objectives of the Global Core Set

The Global Core Set of Forest-related Indicators is designed to support:

1. Measurement of progress towards sustainable forest management (including monitoring SDG 15.2.1);
2. Measurement of progress in implementing the UN Forest Instrument and the UN Strategic Plan for Forests, notably the Global Forest Goals and their associated targets;
3. Measurement of progress towards SDG targets other than 15.2.1, as well as other internationally-agreed goals on forests in other instruments, in particular forest-related commitments of the Rio Conventions.

To achieve this, the Global Core Set identifies a limited number of 21 indicators, which address efficiently and comprehensively the topics identified in high-level political commitments, and thus focuses data collection efforts on the questions of the highest policy importance.

The table below presents the agreed classification.

Note: Tier 1: Methodology and data in place. Tier 2: Methodology in place, data challenges. Tier 3 Methodology and data both present challenges. Four indicators are classed as “Tier 3”: they require substantial and urgent work on concepts and/or definitions before they are usable. These indicators have been included in the Global Core Set, despite the significant problems of concepts and data, because they represent areas of strong policy commitment and monitoring need. By including them in the Global Core Set, the hope is that it will serve as a stimulus to improving the concepts and data availability, making it possible to monitor progress towards the relevant goals and targets.

	Indicator	Thematic element	Unit	Tier	Data supplier	Linkages to globally-agreed goals and targets
1	<b>Forest area as a proportion of total land area</b>	1. Extent of forest resources	%	1	FAO/FRA	Measures progress towards SDG target 15.1 and GFG 1. SDG indicator 15.1.1
2	<b>Forest area annual net change rate</b>	1. Extent of forest resources	%	1	FAO/FRA	Measures progress towards SDG target 15.2 and target 1.1 of the UNSPF. Sub-indicator of SDG 15.2.1.
3	<b>Net GHG emissions (source)/removals (sink) of forests, and carbon balance of harvested wood products</b>	1. Extent of forest resources 4. Productive functions of forest resources	ktCO <sub>2</sub> e/year	2	UNFCCC	Measures progress towards targets 1.2 and 2.5 of the UNSPF. Linkages with SDG goal 13 and measuring, reporting and verifying (MRV) requirements under UNFCCC.
4	<b>Proportion of forest area located within legally established protected areas</b>	2. Forest biological diversity	%	1	FAO/FRA	Measures progress towards SDG 15.2 and targets 2.5 and 3.1 of the UNSPF and Aichi target 11. Sub-indicator of SDG 15.2.1.

5	<b>Change in area of primary forests</b>	2.Forest biological diversity	ha	1	FAO/FRA	Measures progress towards target 1.3 of the UNSPF and Aichi Target 5. Linkages with SDG goal 15.
6	<b>Proportion of forest area disturbed</b>	3.Forest health and vitality	% of forest area	2	FAO/FRA	Measures progress towards target 1.4 of UNSPF
7	<b>Area of degraded forest</b>	3.Forest health and vitality	ha	3	FAO/FRA	Measures progress towards target 1.3 of UNSPF. Linkages with SDG target 15.3 as well as Aichi target 15. Linkages to UNCCD SO 1 and UNFCCC
8	<b>Above-ground biomass stock in forest</b>	4.Productive function of forest resources	Tonnes/ha	1	FAO/FRA	Measures progress towards SDG 15.2 and targets 1.2 and 2.5 of the UNSPF as well as Aichi target 7. Sub-indicator of SDG 15.2.1.
9	<b>Volume of wood removals</b>	4.Productive function of forest resources	m3	1	JFSQ	Measures progress towards target 2.4 of UNSPF
10	<b>Wood-based energy share of total final energy consumption</b>	4.Productive function of forest resources	%	2	FAO, UNECE/FAO	Linked to SDG target 7.2
11	<b>Forest area with a designated management objective to maintain and enhance its protective functions</b>	5.Protective function of forest resources	ha	1	FAO/FRA	Linked to target 1.4 of the UNSPF
12	<b>Employment related to the forest sector</b>	6.Socio-economic functions of forest resources	Number FTE	2	FAO/FRA	Measures progress towards target 2.4 of the UNSPF
13	<b>Number of forest-dependent people in extreme poverty</b>	6.Socio-economic functions of forest resources	Number	3	FAO and UNFF	Measures progress towards GFG 2 and its target 2.1 of UNSPF
14	<b>Contribution of forests to food security</b>	6.Socio-economic functions of forest resources	?	3	FAO and UNFF	Measures progress towards GFG 2 and its target 2.3 of UNSPF
15	<b>Financial resources from all sources for the implementation of sustainable forest management</b>	6.Socio-economic functions of forest resources	\$	3	OECD, WB	Measures progress towards GFG 4 and its targets 4,1 and 4.2 of UNSPF. Linkages with SDG target 15a and 15b
16	<b>Existence of national or subnational policies, strategies, legislations, regulations and institutions which explicitly encourage SFM</b>	7.Legal, policy and institutional framework	References	1	FAO/FRA	Measures progress towards GFG 5 of the UNSPF
17	<b>Existence of national or sub-national forest assessment process</b>	7.Legal, policy and institutional framework	References	1	FAO/FRA	Measures progress towards target 4.5 of the UNSPF
18	<b>Existence of national or sub-national stakeholder platform for</b>	7.Legal, policy and institutional framework	References	1	FAO/FRA	Measures progress towards target 4.5 of the UNSPF

	<b>participation in forest policy development</b>					
19	<b>Proportion of forest area under a long-term forest management plan</b>	7.Legal, policy and institutional framework	%	1	FAO/FRA	Measures progress towards SDG 15.2 and targets 1.3 and 3.2 of UNSPF, Aichi target 7. Sub-indicator of SDG 15.2.1.
20	<b>Forest area under an independently verified forest management certification scheme</b>	7.Legal, policy and institutional framework	ha	1	FAO/FRA	Measures progress towards SDG 15.2 and targets 1.3 and 3.3 of UNSPF. Sub-indicator of SDG 15.2.1.
21	<b>Existence of traceability system(s) for wood products</b>	7.Legal, policy and institutional framework	References	2	FAO/FRA	Measures progress towards target 3.3 and 5.2 of UNSPF

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