MONITORING PROGRESS TOWARDS SUSTAINABLE FOREST MANAGEMENT, THROUGH A SET OF INDICATORS OR AN INDEX: SOME SUGGESTIONS

Background paper to the 2nd Informal Inter-agency Meeting on indicators to monitor progress towards SFM and forest-related SDG indicators, New York, 29. April 2016

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1. Background: defining and measuring sustainable forest management

Sustainability has been a central feature of forestry theory and practice for centuries, if not millennia, but during the 1990s, the concept was the subject of intense discussion and controversy, leading to a strong commitment to "sustainable forest management". This in turn led to efforts at every level – forest management unit, local, national, regional and global – to define sustainable forest management, and to promote implementation, monitoring and reporting. In particular:

- Policy statements and national forest programmes in almost all countries declared that sustainable forest management was the over-arching objective of forest policy;
- systems were put in place for the certification of sustainable forest management;
- sets of criteria and indicators of sustainable forest management were agreed and put in place at the national and regional level.

Definitions of sustainable forest management were agreed in several fora. It has been formally defined, by the UN General Assembly, as follows: [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*". (Resolution A/RES/62/98). This definition contains several key aspects, notably that sustainable forest management is a concept which varies over time and between countries, whose circumstances – ecological, social and economic – vary widely, but that it should always address a wide range of forest values, including economic, social and environmental values, and take intergenerational equity into account.

Despite this rapid progress, it has proved challenging to monitor, in an objective way, progress towards sustainable forest management, because of wide differences in national circumstances (ecology, economy, society, history, legal, policy and institutional framework) and the fact that many components of sustainable forest management are inherently hard to measure, like biodiversity, protective functions, local livelihoods, stakeholder participation or tenure rights. Regional sets of "criteria and indicators (C&I) of sustainable forest management"[1] defined regionally relevant lists of the elements of sustainable forest management, and there is global consensus on seven thematic elements[2], as formulated under the aegis of UNFF. UNFF member states are committed to "monitor and assess progress towards achieving the purpose of the [NLBI]". National, regional and global "State of the forests" reports are prepared regularly, usually based on the C&I sets. Nevertheless, while the quality and range of the available information has increased tremendously over the last two decades, it is still difficult to say unambiguously whether or not a country's forests are sustainably managed, or whether it is making progress towards sustainable forest management. This is due to the absence of a single, widely accepted, measure of sustainable forest management at the national level, or indeed of the area of forest managed sustainably inside a country.

In addition to pressure from within the forest sector for better monitoring and reporting of progress towards sustainable forest management, there is an urgent need to supply forest and forestry related information to high level, multi-sector processes, notably the Sustainable Development Goals (SDGs), in a form which the broader systems can use: simple, objective, understandable, and suitable for analysis as part of a very wide range of social, economic and environmental indicators.

[1] Regional criteria and indicator sets include ITTO, Montréal Process, Forest Europe, Tarapoto process, Low-forest cover countries.

[2] The seven thematic elements, as adopted in the UN NLBI, are Extent of forest resources, Forest biological diversity, Forest health and vitality, Productive functions of forest resources, Protective functions of forest resources, Socio-economic functions of forest resources, Legal, policy and institutional framework.

FAO, in the context of a project on strengthening C&I and their use in policy and practice[3], led the elaboration of initial suggestions to demonstrate the contributions of forests to different SDGs, together with members of the project's Steering Group and Technical Advisory Group. An initial draft set of possible indicators was elaborated, aiming at a limited set of global indicators that are not only able to show forest contributions to SDGs, but are also able to address the information and reporting needs of UNFF, CBD, UNCCD, and UNFCCC. The interim result of this informal group of international forest related agencies and bodies[4] were discussed during a side event at UNFF in New York in May 2015 and the World Forestry Congress (WFC) in Durban, South Africa in September 2015.

At the WFC an informal meeting of international forest related agencies[5] was held on "Further strengthening international collaboration on criteria and indicators, monitoring, assessment and reporting", in the follow up to a call for action to "further develop sets of indicators to measure and report on sustainable forest management, to demonstrate the contribution of forests and forestry to sustainable development and to other sectors, aiming at sets that are simple, clear and easily understood by policy-makers, stakeholders and wider society" (see Annex 1). The meeting concluded, among other things, that a sufficiently strong global political mandate for further work on SFM and forest-related indicators for SDGs exists, that there is a strong will to continue collaboration on further developing indicators for SFM and some related SDG indicators, and that work on an SFM index in the context of SDG 15.2 could start with the development of a short background paper on experiences/lessons on existing SFM indices, focusing on the ones relevant, and building on experiences of the Collaborative Forest Resources Questionnaire. This paper is prepared in accordance with the group's decision. It is intended to be the first step in a consultative process.

In a parallel development, in December 2015, the Interagency and Expert Group (IAEG) preparing the monitoring system for the SDGs under the auspices of the UN Statistical Commission opened a very short window for suggestions through an on-line "open consultation". In a very short time, a few agencies prepared a proposal for an index of sustainable forest management, to monitor progress toward SDG Target 15.2 (see annex 2). As of March 2016, this proposal has been included in the final list of indicators being submitted to the UN Statistical Commission by the IAEG, and was included in the framework for monitoring the SDGs, approved as a "practical starting point" by the UN Statistical Commission to monitor the SDGs. However, the proposal was designed to satisfy the immediate requirements of the IAEG, has not been the subject of a complete consensus forming process (because of the very short window of opportunity), and may not be the final comprehensive solution to monitoring of progress towards sustainable forest management. Nevertheless, there may be opportunities to modify it later in the process, or to use a wider approach in the context of so-called thematic monitoring of the SDGs. FAO regional forestry commissions have also issued requests to work on forest-related SDG indicators.

This paper is based on papers submitted to the UNFF side event (May 2015) and the Durban meeting (7-11 Sept. 2015), as well as interviews with experts from agencies and processes with relevant

[3] FAO project Strengthening Criteria and Indicators for SFM and their use in policy and practice" (GCP/GLO/503/GER), funded by Germany.
[4] The group comprises members of secretariats of global UN bodies, regional C&I processes as well as other bodies relevant to the further development and use of C&I, including FSC, PEFC and the private sector.
[5] Secretariats of global UN bodies (FAO, UNFF, CBD, CCD), regional C&I processes as well as relevant members of the Collaborative Partnership on Forests present at the WFC.

experience[6] conducted in November and December 2015. The interview records, in a common format, briefly present the agencies' activities, the lessons learned and their suggestions for a unified index or set of indicators for SFM. The interview records are being circulated as an accompanying paper, as they contain much useful material.

Although the paper originates in the work of the informal group, it is intended, after discussion by the informal group, to serve as a basis for discussion in a wider context, and ultimately to contribute to decisions and action at the political level, as a means of delivering on the many formal commitments to assess progress towards sustainable forest management.

2. Objectives of the paper

The objectives of the paper are to:

- Review the main issues connected to constructing a set of indicators or an index to monitor progress towards sustainable forest management, on the basis of experience and lessons learned by the participating agencies and processes
- Propose, as the basis for future discussion, options for a set of indicators or index of sustainable forest management, that can be globally accepted and endorsed,

3. Characteristics of a good set of indicators or index to monitor progress towards SFM that can be globally adopted and applied,

A set of indicators or an index of sustainable forest management at global level should be able to be used in a forest sector context, such as UNFF or FRA, or for input on SFM to wider monitoring efforts, notably the SDGs, CBD, UNFCCC and others. This is different from use of the data generated by C&I processes at regional levels, or indicators needed at national levels to pursue and measure national level sustainability goals related to forests. Currently, data collection and reporting at the global, regional and national levels are often organised according to the seven thematic elements agreed at UNFF, which, taken together, and using judgement, make it possible for users to generate their own vision of whether a particular situation is sustainable or not. However, there is, as yet, no widely accepted method of moving from the data collected according to C&I sets to an overall measure of SFM, despite efforts at the global and regional levels.

A global set of indicators or SFM index should satisfy the following, quite ambitious, criteria.

Clarity and readability

It should be clear to all users, even those without specialist forest knowledge, what is the meaning of the indicators or index, and what is the significance of the results. In a set of indicators it may also be useful to distinguish between "context indicators", which describe the underlying situation and "assessment indicators" which may be used to assess and monitor the sustainability of forest management at the national level[7].

Feasibility

Objective, well specified, recent data should be available for most countries, at acceptable cost, both of primary data collection, and of international collection and analysis.

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[6] ITTO, FAO-FRA, CBD, UNFF, Montréal Process, Forest Europe, Teheran Process for Low Forest Cover Countries, European Commission (DG AGRI), UNECE/FAO, OTCA

[7] For instance, forest cover, or share of GDP indicate the context, and are largely determined by history or trends in other sectors. It is not meaningful to identify ideal values for these indicators (although targets can be set for them through national policies). However uncontrolled loss of forest land may well be considered unsustainable in all circumstances, and a consequence of the management applied (or not applied) in the country.

Scientific validity
The terms used should be defined precisely, and the link to SFM should be demonstrable

Compatibility with SDG and other broader systems
This implies not only clarity and simplicity, but also that the index and its components are "scale neutral" (e.g. ratios, percentage shares or changes over time, rather than absolute numbers).

Comprehensive
The indicator set or index as a whole should cover all aspects of sustainable forest management (at least the seven thematic elements) not just existence or absence of forest cover.

Applicable to all approaches to SFM
The indicator set or index should not implicitly assume one specific model of SFM, because of the enormous differences of climate, history, development etc. between countries.

Address the national level.
The indicator set or index is designed to report about SFM at the national level, not to assess the sustainability of management on a particular forest management unit, although it is conceivable that the area of FMUs managed sustainably (e.g. certified, or with a management plan) could be one indicator at the national level.

Relevant for political decision-making and monitoring and reporting
The indicator set or index should be suitable for use as a support for evidence based policy making. It should therefore be sensitive to policy, and not be determined by factors which will change little in the short term, as they are determined by history or environmental conditions.

4. Approaches used so far in international reporting on SFM
There have been several approaches to measure progress towards sustainable forest management, at the national, regional and global levels. This section briefly summarises the approaches used, at the regional and global level, along with short remarks about the advantages and disadvantages of each approach, based in part on the interviews carried out with experts from relevant organisations.

Global Forest Resource Assessment 2015

Approach
The main chapter of FRA 2015 addressed sustainability indicators, including ecosystem condition and productivity, ecological integrity and biodiversity and economic and social benefits. One section of this chapter focused on sustainable forest management, although this might appear at first site to overlap with the other sustainability indicators. The SFM section analysed enabling conditions for SFM. A "filter" approach was used, starting with the area of land identified as for "permanent forest use", and then identifying, within successive totals, how much forest area was:

- affected by SFM policies,
- subject to SFM legislation,
- where a stakeholder platform was in place
- covered by forest inventory,
- for which national SFM reporting has been carried out
- forest with long term management plans
- managed for soil and water conservation, high conservation value and social engagement as part of forest management plans

- forest where stakeholders are involved in planning, operations and review.

Of the global total forest area of just under 4 billion ha, 2.2 billion ha were recorded as being under permanent forest use, and a little more than 1 billion ha passed through all the "filters". However, there is no statement in FRA2015 on the area of sustainably managed forest in the world. Data were supplied by official national correspondents and are easily available at the website of FAO-FRA.

Comments

FRA2015, in this section, approached SFM purely through its enabling conditions, notably policy, law, participation and evidence based decision making. It should be borne in mind that the section on "sustainable forest management" is only one part of a major array of information on trends in forests all over the world, so the information on SFM tools can be seen in the context of outcomes presented in other sections of FRA2015.

The approach generated much useful and relevant information about presence or absence of policies, legal instruments, national forest programmes, management plans and certification. However, the filter approach seems to be quite misleading, as it ignores the fact that some of the tools apply to all forests, and others to a subset of them. Furthermore the decision to start the filtering process with "permanent forest use" immediately excluded countries which did not supply this information, often because this concept did not apply in their country.

Millennium Development Goals

Approach

Indicator 25 under Goal 7 (Ensure environmental sustainability) was "Proportion of land area covered by forest (FAO)". This information on net trends in forest cover was supplied by FAO, through FRA.

Comment

This indicator is easy to understand and highly relevant. Furthermore there is in place a well established and transparent process, with strong country participation, and well accepted definitions (FAO-FRA), to supply the information. However, it does not address the full nature of sustainable forest management as the focus is only on the extent of forest land, neglecting criteria on forest health, management aspects, biodiversity or socio-economic aspects.

Global Forest Resource Assessment 2005 and 2010, and related regional reports

Approach

The so-called "traffic lights" approach was applied at global level in GFRA 2005 and 2010 and at regional[8] level. It took a selection of the parameters measured by FRA (18 for FRA2010, organised according to the seven thematic elements), and examined change (average annual rate for two ten-year periods), classifying it as green (positive change rate >0.5%), yellow (no major change) or red (negative change rate <0.5%). Further representativity or data availability were rated as High - reporting countries represent 75-100% of total forest area, Medium –reporting countries represent 50-74 % of total forest area, Low –reporting countries represent 25-49% of forest area. No results were presented for data availability less than 25%

Comment

The approach simplified the presentation of results by selecting and colour-coding the most important trends. It is possible to apply this approach at all levels, national, regional and global. However, it

[8] For instance in State of Europe's Forests 2007.

does not provide an overview of SFM, and is still quite complex, leaving users to make their own judgements. It is also rather arbitrary in its methods: why 0.5% and not 0.1% or 1.0%? Is it always clear which direction is "positive" and which is "negative"? What about countries which have achieved, and are maintaining, a satisfactory position (should they be yellow – no change - or green - positive)? However, red traffic lights highlight clearly that further actions to achieve sustainable forest management will be needed.

Sustainable Development Goals (SDGs)Target 15.2

Approach

Target 15.2 refers to promotion and implementation of SFM, as well as deforestation, forest degradation and afforestation. An Inter Agency and Expert Working Group (IAEG) is putting in place a system to monitor the SDGs. FAO and partners profited from a short time window to submit a proposal (annex 2) to monitor SFM. This proposal identifies four indicators:

1. Annual average percent change in forest area over most recent available 5 year period
2. Annual average percent change in stock of carbon in above ground biomass over most recent available 5 year period
3. Share of forest area whose primary designated function is biodiversity conservation, most recent period
4. Share of forest area under a forest management plan, of which forest area certified under an independent forest management certification scheme, most recent period

For each of these components, countries can set national targets, monitor and report on progress. The use of national targets allows each country to define sustainable forest management for its own specific circumstances, within a coherent international framework.

If preferred, all of this information could be collected through the Collaborative Forest Resource Questionnaire (CFRQ), used for FRA and other studies. Data collected through the CFRQ are subject to an extensive checking process by national correspondents and agency experts, at the end of which they are officially validated.

The process of monitoring the SDGs is ongoing. In March 2016, the UN Statistical Commission approved a list of indicators (see Annex IV of E/CN.3/2016/2/Rev.1), as a practical starting point for monitoring the SDGs, which includes for Target 15.2 "Progress towards sustainable forest management" (with no other indicators for that Target). In 2016 and 2017, the IAEG will develop the system, notably through putting in place a "tier system"[9], agreeing on reporting mechanisms and methodologies, including baselines. The meeting will be kept informed of the latest developments for the IAEG.

Comment

This proposal was designed for the specific circumstances of the multi-sector monitoring of the SDGs, and is therefore highly simplified and easily measurable and understood, from a non-forestry background. As of March 2016 it appears that it will be incorporated into the SDG monitoring system being put in place by the UN Statistical Commission. From the point of view of sustainable forest management, it is probably not comprehensive enough, as it covers forest area, wood production/use, biodiversity and one major SFM tool (management plans), but says nothing about forest health and

[9] Tier I: an established methodology exists, and data are available. Tier II: a methodology exists but data are not easily available. Tier III: no methodology has yet been established.

vitality, protection and socio-economic functions, or about participation. However, it is progress compared to a single forestry indicator (change in forest area) as used for the MDGs.

Criteria and indicators processes, "state of the forests" reports

Approach

Since the mid 1990s, a number of regions have developed criteria and indicators of sustainable forest management, which have played an important role in specifying the more general definition of SFM, and how it might be measured. As part of the implementation of the C&I, "state of the forests" reports have been prepared, using different approaches to data collection and analysis. Typically these reports, which may be national or regional, collect and present data for each of the indicators defined in that region, using harmonised concepts and terminology. They do not usually make a formal assessment of the sustainability of forest management in that country or region, but many experts (including several interviewed for this paper) consider that these reports which must be comprehensive in their approach, and take place in a formal SFM context, make it possible for the reader to make a personal judgement about sustainability of forest management in the country or region. The C&I sets themselves are considered to provide an implicit definition and the related reports an overview of SFM in practice.

Table 1

SFM reporting and assessment by regional C&I processes

For further details, and references, see the interviews

C&I process: major recent output	SFM assessment or reporting of status and trends only?	Approach used for SFM assessment (if any)
Amazon Cooperation Treaty Organization (OTCA): Tarapoto process indicator set	Focus on developing and harmonising indicator set and joint monitoring of deforestation. No indicator-based surveys or assessments	NA
COMIFAC: Etat des Forêts 2013	Reports status and trends by country based on C&I in 2008, 2010, 2013. No formal assessment of SFM	NA
FOREST EUROPE: State of Europe's Forests 2015	Reports status and trends, structured around pan-European indicators. In 2015, no formal assessment of progress towards SFM. SoEF 2007 and 2011 did assess progress.	2015: NA. 2011: Scale of 1 to 5 assessed for each indicator, with common thresholds, with regional totals. Many technical issues. 2007: Traffic light approach.
International Tropical Timber Organization (ITTO): State of Tropical Forest Management 2011	ITTO pioneered the C&I approach and was the first organisation to issue guidelines. Latest report assesses progress towards SFM, using available data at	The report "estimates the area of natural forest in each ITTO producer member country that can reasonably be thought to be under management that is largely consistent with SFM[10]"

[10] "These estimates have been derived for the natural-forest production PFE (permanent forest estate) by adding the forest management units (FMUs) that have been independently certified or in which progress towards certification is being made; have fully developed, long-term (ten years or more) forest management plans with

	the FMU level (see footnote), and applying expert judgement when necessary. Report of 2005 pioneered "traffic light" assessment	
Montréal Process: Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests (Fifth edition, 2015)	The focus is on the C&I set itself. The member countries use this set to prepare Country Reports on progress toward sustainable forest management and, for some countries, as the basis for domestic processes to monitor, assess and report progress towards sustainable forest management. Overview reports for all countries (separately) were published in 2003 and 2009. There is no common report on the state of forests in the Montréal Process area.	An index has been discussed in the Technical Advisory Group but they are not keen about an index because of lack of clarity as to the reasons for change in such an index.
Tehran Process Secretariat for Low Forest Cover Countries: Tehran Process LFCC indicator set	There is no common report on Forests in the LFCC so far.	NA

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Comment

These reports are comprehensive and transparent, and do not over-simplify the complexities of the various situations. National correspondents are usually closely involved in their preparation, ensuring that specificities of the situation are taken into account. However, it is often hard to assess the significance of the large amounts of data provided, which is more descriptive than an assessment of the sustainability of the situation in the countries.

Other approaches

A range of studies and pilot exercises have been undertaken over the years to develop possible SFM indexes, by different bodies. Most recently, UNECE/FAO has initiated a pilot study "SEMAFOR", using data collected through CFRQ and State of Europe's Forests 2015, to assess the sustainability of forest management at the national level. For this study, the pan-European indicators were expressed in a "scale neutral" way (%, ratios, rates of change etc.) and were divided into "context indicators" (mostly descriptive, largely determined by a country's history, geography or economics, and unlikely to change in the short term), "background indicators" (too weak and difficult to define for use) and "assessment indicators". For the latter, common thresholds were established. If these thresholds were exceeded (according to the international data set), national correspondents were asked to check the accuracy of the information, to say whether the situation was really a cause for concern in their country, and, if so, what the policy response had been. In the great majority of cases, apparent causes of concern turned out to be acceptable, even desirable, in the context of the country. Despite the use

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firm information that these plans are being implemented effectively; are considered as model forest units and information is available on the quality of management; and/or are community-based units with secure tenure for which the quality of management is known to be of a high standard."

of common thresholds, every effort was made to avoid imposing a single common model of SFM assessment at the national level.

Although the process is not yet complete (a review of results is foreseen in March 2016[11]), and has not been formally evaluated, some results are already apparent. It has proved possible to define a set of assessment indicators (20 in all), and to collect usable data for all of them. Setting thresholds resulted in a "lowest-common-denominator" approach, so the thresholds agreed are not very challenging. The process of dialogue with national correspondents has been very fruitful, for both sides, even though it resulted in a situation where most of the "potential areas of concern" evaporated when national circumstances were better understood. The main output so far is a series of national data sheets, in a common format, of context and assessment indicators, with explanations of potential areas of concern. The picture emerging is still quite complex.

Proposals from experts interviewed for this paper

As part of the preparation of this paper, experts were interviewed on the experience of their organisation in the field of monitoring sustainable forest management. Experts were from the following organisations: ITTO, CBD, UNECE/FAO, EU DG AGRI, FAO-FRA, FOREST EUROPE, Montréal Process, OTCA (Tarapoto Process), Tehran Process for LFCCs, UNFF. The interviews are circulated as a separate file. All experts gave their personal opinion, not the official position of their organisation.

The interviews demonstrated the wealth of relevant experience, the different circumstances of different regions and agencies, and a few major issues which must be addressed in order to prepare a consensus on how to measure sustainable forest management at a global level.

Some of the main points emerging from the interviews could be summarised as follows:

- work on criteria and indicators, and other SFM tools, over the last two decades has brought progress in understanding SFM and the use of C&I in evidence based policy making and communication, but many challenges remain.
- Some, but by no means all, of the interviewees call for an easily understood measure of sustainable forest management, either as a single index or as a limited list of key indicators. Others are concerned that such an approach might oversimplify complex issues and reduce transparency.
- Some interviewees give priority to measuring outcomes (changes in forest area, protected areas, livelihoods etc.), while others focus on policies and instruments, such as national forest programmes, management plans, certification.
- Several interviewees proposed partial or complete lists of indicators to be used in an index of SFM. These have been used as the basis for the proposals in this paper.

Experts from the following organisations expressed clear support for a single indicator or a small set of key indicators: ITTO, CBD, FAO-FRA, OTCA, Tehran Process, UNFF.

Experts from the following organisations expressed doubts about the concept of a single index, on grounds of lack of transparency and problems linking causes to effects if using only a single index figure, although some accepted the idea of a small set of key/headline indicators: ECE/FAO, EU, FOREST EUROPE, Montréal Process.

[11] The draft discussion paper may be downloaded from http://www.unece.org/forests/welcome.html or is available on request from kit.prins@gmail.com

5. Possible components of an indicator set or SFM index

There are very many quantitative and qualitative components of sustainable forest management, which have been used as indicators: ITTO has 57 indicators in its most recent version, the Montréal Process has 54 indicators and Forest Europe 45. Some of these indicators are of regional importance only, others do not satisfy some of the above criteria, notably as regards global data availability, and some appear in several indicator sets. Nevertheless it is clear that a selection must be made to achieve an indicator set or index which is usable at the global level, identifying a small number of globally relevant indicators, for which data are available.

The interviews mentioned in section 4 invited the experts to make suggestions for a possible global indicator set or index for SFM. Experts from the following global or regional organisations and C&I processes listed possible key indicators: ITTO, ECE/FAO, FAO-FRA, FOREST EUROPE (FE), Montréal Process (MP). These suggestions are presented in Table 2 below. The definition of the indicators chosen varies widely (e.g. per hectare values, rates of change etc.), but this table focuses only on the area to be addressed, not the formulation of the indicator. Furthermore, it should be stressed that these are the personal views of the experts interviewed, not the official positions of the organisations and agencies.

Table 2

Expert proposals for indicators to be included in global indicator set or index of SFM

	ITTO	ECE/FAO	FRA	FE	MP
Forest area	X	X	X		X
Management plan	X		X	X	
Area for conservation of biodiversity	X	X	X	X	
Growing stock/above ground biomass	X	X	X		
Area natural forest			X		
NFP			X		
Production forest + multiple-use forest			X		
Certified area				X	
Area for protection				X	
Socioeconomic contribution					X
Carbon sequestration					X
Ecological functions					X

Notes:
The concept of "Forest area" includes the ideas of net change, deforestation, expansion etc.
"Area for conservation of biodiversity" includes both the concept of "protected for biodiversity" and of "primary management function biodiversity"

In the context of the work on developing a limited set of global forest-related indicators that are able to show forest contributions to SDGs and at the same time cover information and reporting needs for UNFF, CBD, UNCCD, and UNFCCC goals, objectives and targets on forests, a list of 15 major "Indicators on global forest related policy goals, objectives and targets" were elaborated and presented at UNFF in May 2015. These are not intended as components of a set of indicators on SFM, or an SFM index, but as indicators which could be used to monitor progress towards existing forest related global policy goals, including the Aichi biodiversity targets, the Global Objectives on Forests and the

SDGs – as far as possible through existing data and data collection mechanisms. These are presented in table 3.

Table 3

Indicators on Global Forest related policy goals, objectives and targets with associated existing data collection mechanisms and data availability

Proposed Indicators	Relevant Global Targets			Description and Data Collection
	SDG	GOF	CDB Aichi	
1. Forest area and type of forest area as a percentage of total land area.	15.1, (6.6, 15.2, 15.3)	1, 3	14	**Data Type: Quantitative** **Data Quality: * * *** Data collected on forest area / cover enabling information to be provided on changes over time. Data availability, existing indicators and data collection: FRA 2015 collects data on Ha of forest and other wooded land and its change over time (1990, 2000, 2005, 2010, 2015); Forest expansion: Afforestation, Natural forest expansion, Deforestation (of which is human induced), Reforestation (of which is artificial reforestation) - *(Question 1 FRA2015)* Data can also be linked with Question 2 of FRA2015 on area of natural and planted forests and how it has changed over time to provide increased specificity. FRA uses categories of: Primary forest, Other naturally regenerated forest (of which is of introduced species / naturalised species), Planted forests (of which is of introduced species), Mangroves (of which are planted). Data in FRA 2015 shows forest area for all countries.
2. Net carbon stock flows from / to forest biomass	15.1, 13.2	1, 3	14	**Data Type: Quantitative** **Data Quality: ***** Data provision on levels of carbon in five pools. Figures reported on a periodic basis, this can provide information on changes over time and act as a proxy for forest health (if declining then forest is likely to be being degraded or over-used) and can also be utilised to provide information on net emissions from the forest sector. Data availability, existing indicators and data collection: Data on carbon stocks and growth rates of forests (mill metric tonnes) collected in FRA2015 divided into: Carbon in; above ground biomass, below ground biomass, dead wood, leaf litter and Soil carbon (although information on carbon in soil, dead wood and litter is not likely to be included). *(Question 3 FRA2015)* Data on carbon stock in living biomass available for just under ¾ of countries within FRA2010 Data on net emissions is available through FAO - FAOSTAT Emissions database. This draws on data on levels of deforestation, and degradation minus removals from net regrowth of forests and requires information on carbon stock in different carbon stores. Calculation of net emissions is done based on IPCCC good practice guidelines. (SDG Background Doc). Coverage of all FAOSTA countries. Reliability and data availability varies by country.
3. Forested areas affected by	15.3 (6.6)	1	14, 15	**Data type: Quantitative** **Data Quality: ****

desertification, land degradation, and drought				Provides linkage between forestry and desertification, land degradation and drought. Data availability, existing indicators and data collection: No specific indicator utilised for land degradation. UNCCD utilises framework of tiered indicators with land cover, and land use, as Tier 1 and stand alone indicators potentially drawn form existing global remote sensing data sets. Tier 2 indicators on trends in land productivity and levels of organic soil carbon providing complimentary information. A third tier related to poverty rates, tenure ecosystem services and biodiversity are also being discussed. FAO is also starting a consultation process to develop an indicator on "Area under SLM" [WOCAT1 process] and in the support of UNCCD implementation and will support countries to assess and map (and eventually monitor) SLM as well as degradation i.e. progress which is of more interest to policy makers and in line with Bonn Challenge, Aichi targets etc. *(SDG Background Doc).* FAO2015 collects data on Ha of forest damaged under categories of; Burned, Area of detectable reduction in forest health caused by outbreaks of insects, disease, Damaged by severe weather events *(Question 8 FRA2015)* and, Area of forest that has undergone a reduction of canopy cover *(Question 9 FRA2015)*
4. Mountain Green Cover Index	15.4	3	14	**Data Type: Quantitative** **Data Quality: Unknown – Indicator currently under development** Indicator to measure the changes of the green vegetation in mountain areas - i.e. forest, shrubs and trees based on the Global Land Cover (GLC) SHARE maintained by FAO. Data availability, existing indicators and data collection: The database provides a set of eleven major thematic land cover layers resulting from a combination of "best available" high resolution national, regional and/or sub- national land cover databases. The database is produced with a resolution of 30 arc-second2 (~1sqkm). The GLC- SHARE 2012 Beta-Release 1.0 is published by FAO in 2014. Complete free and open access to the data and metadata products are available at FAO GeoNetwork (www.fao.org/geonetwork)." Thanks to the way GLC-SHARE is structured, the Mountain Green Cover Index has a global coverage and it is possible to compute the indicator at the global, regional, national and sub-national level. In addition, the indicator allows for an analysis across the different mountain elevation classes. Comparability across countries is technically feasible, but it is not necessarily the most interesting statistics that the index can provide. (*summary from SDG Background Paper*)
5. Coverage of protected areas broken down by ecosystem type, including total area of forests in protected areas;	15.1, 15.4, (14.5, 2.5, 6.6)	1, 3	11, 14	**Data type: Quantitative** **Data quality: ***** Data collected across the FRA, UNFF, and CBD. FRA data does not disaggregate by forest types, information collected under the CBD is not presented in specific indicator format. Data is also collected by a number of other initiatives focused on specific elements of Pas, e.g. IBAs, Alliance for Zero Extinctions. Data availability, existing indicators and data collection: Data across initiatives is collated by the World Database on Protected Areas, which provides global coverage. There 2014 report on global status of PA[12], which includes over 200,000 PAs in 193 countries with provided in advance of the report following a request from the CBD Exec Sec with 124 countries having submitted updates as of August 2014 with a further 15 in process. The Report is able to classify

[12] Juffe-Binoli D. et al (2014) Protected Planet Report 2014. UNEP-WCMC: Cambridge UK

				PA coverage by 14 terrestrial biomes and eight bio-geographical realms[13] – it notes, however, that while this is useful at the global level global eco-regions are too coarse to apply at national level requiring further refinement in the definition of national targets and measures[14]
6. Forest area under sustainable forest management	*2.4, 15.2, D15.3*	*1, 3*	*7, 14, 15*	**Data type: Quantitative / Qualitative** **Data quality: ** - new methodology** Data compiled from a combination of quantitative and information collected across 15 sub-indicators all of which are currently covered within the FRA2015. Indicators include: A) Forest area designated or expected to be retained as forest land; B) Policies that explicitly encourage SFM; C) Legislation and regulations that govern and guide SFM; D) Stakeholder platform for input into national forest policy; E) Forest inventory; F) National reporting; G) Forest management plans; H-J) Soil and water conservation, high conservation value forest and social engagement as part of forest management plans; K-M) Stakeholder involvement in operational planning, operations and review. Data availability, existing indicators and data collection: Data available for all indicators with 70% of global forest area covered by data in top two data tiers within FRA. [15]
7. Share of wooded green and public space	11.7	2	None	**Data type: Quantitative** **Data quality: N/A – Currently no indicator available, development of new indicator required** Indicators and approach to data collection currently not fully developed. Data availability, examples of existing indicators and data collection: Data available within global city prosperity index and can possibly be calculated from existing mapping data sets.
8. Forest-contribution to livelihoods	2.3, 8.3	2	7	**Data type: Quantitative / Qualitative** **Data quality: ** - Further work required on scope of indicator across types of livelihood contribution** Data on forests' contribution to livelihood collected to date focuses on formal employment, e.g. FRA2015 Q19: People employed in activities related to production of goods derived from forests (ISIC/NACE Rev.4 activity A02). Other contributions to income and household assets are partially covered through censuses and representative household surveys. Weak data and methodologies exist on estimating subsistence use, informal income and employment, which constitute a large part of forest contributions. Data availability, existing indicators and data collection: FRA2015 collects: People employed in activities related to production of goods derived from forests (ISIC/NACE Rev.4 activity A02). Full time equivalent, disaggregated by gender from 1990 (*Question 19 FRA2015)* and Value of harvested non-wood forest products. (*Question 4 FRA2015).* Formal employment data also available from ILO statistics database and Industrial Statistics Database (INDSTAT 4) of the UN Industrial Development Organization. Information on informal employment partly available through Household Consumption (Household Income) and Expenditure surveys, 2010 World Population and Housing Census Programme, Livelihoods Standards Measurement Survey – integrated survey of Agriculture, as well as from data that can be calculated on wood fuel and charcoal production. These figures are however variable in quality across countries with limited support from national statistics.

[13] Defined by Olson et al (2001) Terrestrial eco-regions of the world: a new map of life on earth' *Bioscience 51: 933-8.*
[14] Juffe-Binoli D. et al (2014) Protected Planet Report 2014. UNEP-WCMC: Cambridge UK
[15] Ken MacDicken –Team Leader - FRA - FAO pers comms

9. Share of wood based energy in total primary energy supply.	7.1	2, 3	15	**Data type: Quantitative** **Data quality: **** Share of wood based energy in total energy supply provides indication of importance of wood fuel at the national level. Data collection will include information on industrial and domestic use. Data availability, existing indicators and data collection: Data on wood fuel removals (value at market gate) provided from FAOstat to countries in FRA for review (*Question 4 FRA2015)*. Information about the proportion of households using woodfuel for cooking available from the results of national population censuses and a number of other large-scale surveys including: Living Standards Measurement Studies (LSMS) supported by the World Bank; UNICEF's Multiple Indicator Cluster Surveys (MICS); WHO's World Health Survey (WHS); and the Demographic and Health Surveys (DHS) supported by USAID. Utilising this approach FAO 2014[16] were able to gain figures for 134 countries, accounting for 83 percent of the global population, although figures can vary significantly from nationally reported estimates.
10. Inclusion of time bound forestry targets in national development and plans and climate change strategies	4.2, 15.9	None	2, 7, 13,14, 17, 18	**Data type: Qualitative** **Data quality: ** - Further work required on scope of indicator** Information on presence / absence of forestry targets in development plans and climate change strategies as well as nature of these targets. There is also the potential for further elements to be added to this assessment – for example sustainable procurement policies. Data availability, examples of existing indicators and data collection: UNFF11 voluntary reporting format collects information on: What steps your government has taken to raise the importance of forests and SFM in national development plans, poverty reduction strategies or other equivalent plans? (*Question 3 UNFF11 reporting format)* and Whether government's national forest policy/strategy or national forest programme contain time-bound and quantified targets related to the forest area? *(Question 5 UNFF11 reporting format)*
11. Existence of national multi-stakeholder policy dialogue mechanisms	16.7, 17.7 (16.10)	None	None	**Data Type: Qualitative / Qualitative** **Data quality: ***** Data collected on stakeholder engagement mechanisms within FRA, UNFF and CBD with FRA focused on existence of national platform while UNFFF also disaggregates engagement by stakeholder group and asks for assessments of effectiveness Data availability, existing indicators and data collection: FRA2015 looks at presence / absence of a 'national platform that promotes multi-stakeholder engagement' defined as A recognized procedure that a broad range of stakeholders can use to provide opinions, suggestions, analysis, recommendations and other input into the development of national forest policy. (*Question 11 FRA2015)*
12. Forest tenure, ownership and management rights.	1.4. 5.a	None	18	**Data Type: Quantitative / Qualitative** **Data quality: ** - Further work required on scope of indicator** Data collection currently varies across initiatives. Quantitative data collection on ownership is available from FRA, as well as land registry information, with good global coverage. Data is across different initiatives is however varied in classifications of ownership and whether ownership relates to land or forest resources. Within many of these assessments information is also not disaggregated by gender. More detailed qualitative assessments of tenure and quality of tenure are available but are often one off project based analysis and data

[16] FAO (2014) State of the World's Forests

				collection and are often location or stakeholder group specific. Data availability, existing indicators and data collection: Data collected across the FRA, UNFF and CBD however this is done with differing classifications. FRA2015 utilises: Ownership and, management rights of forest resources (not land) by ha – divided between: Public Administration (national / sub-national levels), Individuals, Private companies, Communities and Other *(Question 18. FRA2015)* FRA2015 reporting covers 93% of global forest area[17]. Other sources such as agricultural censuses focus on land ownership making comparison of figures difficult with FRA data. Limited information on the nature and quality of tenure / ownership rights is also available at the global scale.
13. Existence of country financing / investment strategy for forests and availability of finance.	7.5	4	20	**Data Type: Qualitative / Qualitative** **Data quality: ** - Further work required on scope of indicator** Data on forest finance and investment strategies as well as levels of finance available is collected by a number of initiatives. However the comprehensiveness of data available as well as the differing classifications across initiatives / countries makes data comparison / collation difficult. Proposal would be to collect a combination of qualitative data on presence / absence of finance strategy with potential for additional elements of quality to included. Data would also be collected on whether sufficient finance was available to make this a reality and how much was available from different sources (domestic and international, public and private) sources (quantitative data). With the potential to also look at planned vs actual expenditure and areas in which expenditure is focused. Data availability, existing indicators and data collection: Data on strategies collected by UNFF as part of preparation for 11th session including: Has your government developed or updated financing strategies to achieve SFM and to implement the Forest Instrument? (Question 9 - UNFF11 reporting format) FRA 2015 utilises Public expenditure on forestry *(Question 17. FRA2015)* UNFF11 utilises - Government mobilisation of 'significantly increased financial resources since 2007 for implementation of SFM – divided by: Domestic public, Domestic private, Public international, External private (Values for 2007 and 2013) *(Question 11 UNFF11)* Data also available from OECD-DAC Creditor Reporting System (CRS).
14. Action taken on ecosystem and biodiversity valuation (SEEA-Forestry, other)	15.9	Non e	2, 7, 13, 17, 18	**Data type: Quantitative / Qualitative** **Data quality: * - further work required on definition of indicator and nature of data collection** Efforts to integrate ecosystem and biodiversity valuation into national accounts is still at an early stage and data is limited more linked to whether countries are testing such approaches as opposed to information on actual valuations. With methods and guidelines being improved however data availability is likely to increase in coming years. There is the potential to utilise a tiered approach to data collection based on quality of data available on with each country. Data availability, examples of existing indicators and data collection: Data collected on number of countries 'incorporating natural resource, biodiversity, and ecosystem service values into national accounting systems' (Aichi Target Indicators – A.2.i) and on actions related to PES under the UNFF (Questions 10, 12). Some information available from project based work on use of UN SEEA-EEA accounting systems.
15. Legal	16.3,	Non	None	**Data type: Qualitative**

[17] Ken MacDicken –Team Leader - FRA - FAO pers comms

framework and enforcement	16.6, 16.10	e		**Data quality: * - further work required on scope of indicator** Potential compound indicator looking at a number of elements of the legal framework. Potential elements of this to include: Specific definition of timber legality, Requirements for access to information on the forest sector (including budget information) Data availability, existing indicators and data collection: Data collection is predominantly qualitative and with detailed information based on specific country assessments or project based analysis. On overall legal context the UNFF11 collect information on 'steps (has your) government taken to prevent and reduce international trafficking in illegally-harvested forest products such as timber, wildlife and other biological resources?' (UNFF11 – Question 2). Specific data collected under other mechanisms such as EU FLEGT initiative although limited in global coverage. A number of initiatives are also looking at transparency issues such as the Open Budget Initiative.

There is considerable overlap between the 15 possible indicators proposed by the experts interviewed and the 15 indicators relevant to forest related goals and targets identified by the group before UNFF. Certainly these two lists provided a good starting point from which to choose the components of a global indicator set or index to measure progress towards SFM

6. Conceptual considerations

Before generating proposals on measuring sustainable forest management at global level through a set of indicators or an SFM index, it is necessary to take into consideration some conceptual questions, which are briefly described below. If these aspects are not considered, and decided, there is a serious risk of proposing inconsistent or impractical solutions. In many cases, there is not a single "correct" solution, as these are choices to be made, to achieve stated objectives.

Fitting the indicators to their purpose and audience

Indicators may be relevant to many different circumstances and uses, for instance support for policy making, performance monitoring, valuation of services, and communication, at local, national and global levels. The set of indicators of SFM should take their purpose specifically into account. The indicator set/index under consideration here is intended for ***monitoring progress at the national level, but in a global context, as a support for policy making and policy evaluation, as well as for communication***. It should be ***useful and understandable for forest sector policy makers, but also for a wider range of users, such as civil society and the private sector in the forest sector, and those concerned with wider questions of sustainable development***. This objective underlies all the options proposed below.

Relative importance of indicators on outcomes v. indicators on instruments

Should the indicators measure ***outcomes***, such as changes in forest area or protected forest area, or the ***instruments*** needed to bring about sustainable forest management, such as national forest programmes, forest policies or certification systems? The former are the ultimate result, but may well develop (positively or negatively) for reasons outside the forest sector, such as trends in growth, urbanisation or demographics. The latter may, or may not, be well designed and implemented. This difference must be taken into consideration both when constructing the index, and in interpreting the results. It is perfectly conceivable to have a forest sector with satisfactory outcomes emerging from bad policies, or an unsustainable forest situation despite excellent SFM tools.

Concentration on assessment indicators only, or also context indicators?

Some features are determined by geography or history, or by trends outside the sector: while important, they cannot be changed by forest policy or management measures, at least in the short term[18]. To what extent should these be part of an SFM index? In general, while measuring progress towards sustainable management, it would appear appropriate to focus attention on dimensions which can be influenced in the short to medium term, presenting them against a background of "context indicators".

Data sources

The formulation of indicators or indexes should take into account how the data used to monitor SFM will be collected and analysed. In the first place, it is unwise to develop indicators for which few data are available or for which data quality is weak. As regards data collection, countries may be asked to report directly, or the data may be taken from a trusted international data source to whom countries routinely provide data or who are authorized by countries to provide data (e.g. remote sensing).

[18] Examples, among core indicators, are forest cover, net annual increment, or share of the forest sector in GDP.

National reporting has the advantage of engaging countries directly in the process, and clarifying their responsibility. However, in many cases, national definitions and terminology differ from the agreed international definitions, which are of necessity compromises, so it is likely that data reported directly will not be fully comparable between countries. Using an international data source means that issues of comparability and definition have already been addressed, often through consultation and capacity building over many years. Collecting and analysing international data is also more convenient and quicker. For SFM, if it is decided to collect internationally comparable data, the FAO-FRA has a large database and well tested and discussed concepts, terms and definitions. Since FRA2015, FAO-FRA has been working closely with other relevant agencies in the Collaborative Forest Resource Questionnaire (CFRQ), following the example of the Joint Forest Sector Questionnaire. All FRA data are reviewed and endorsed by national authorities. As the next FRA process has not yet started, it would be possible to arrange for many, if not all, the relevant parameters to be collected in a format suitable for the global monitoring of SFM. To use FRA as a data source does not mean that national authorities are sidelined or ignored: all FRA data are already validated by countries, and no doubt any SFM assessment process would involve countries at all stages.

International benchmarks, national targets, or a combination of the two?

Any assessment of "progress" is based on baselines, benchmarks or thresholds, even if these are implicit and not clearly stated. Even simple measurements of rates of change, as in the "traffic lights" approach, embody an assumption of which direction of change is desirable and which is not. Given the wide variety of what appears sustainable in different national circumstances, agreeing on what is sustainable, for all countries in the world, is challenging. The alternative – staying with description, rather than assessment, without any evaluation of whether trends are positive or negative – is however profoundly unsatisfactory. If it is decided that it is not desirable or possible to set international benchmarks, thresholds or targets, implicit or explicit, there is also the possibility of asking countries to set thresholds or targets, as intended in the context of the SDG indicators, including on SDG 15.2. Progress can be monitored in relation to these national thresholds or targets. If the thresholds or targets are expressed in terms of the standard agreed terms and definitions, monitoring can be done using comparable international data, which may well be the most credible and cost-efficient process. If countries set their own thresholds or targets, they can focus on national areas of concern or ambition. This has the advantage of a differentiated approach, and avoids the lowest common denominator approach which is frequent when common benchmarks are agreed. Results could be expressed either in absolute terms or as progress towards goals[19]. However, using national targets implies a supplementary - and sensitive - stage: requesting countries to set goals or targets by which they will assess themselves (or will be assessed) in the future.

Index or set of indicators?

The purpose of an index is to combine observations to provide a single figure, often of a trend over time. An SFM index would have the great advantage, if carefully constructed and widely accepted, of providing a visible and easily understood picture of progress towards sustainable forest management. This single picture could then be combined with data for other sectors, to provide a detailed and comprehensible picture of trends for sustainable development overall, as envisaged through the SDGs.

[19] It might be possible to follow the example of CBD, which provides in its flagship publication (Global Biodiversity Outlook at https://www.cbd.int/gbo/) standard graphs indicating whether a country is on track to exceed target, on track to achieve target, progress but at an insufficient rate, no significant overall progress or moving away from target.

However, there are disadvantages in the use of indexes, notably that an index may conceal important trends (for instance if positive trends for one component cancel out negative trends for another) if data on components are not disclosed or widely accessible. It may be meaningless or misleading to set thresholds or targets or measure progress in terms of an abstract combination of trends, rather than for specific directly measurable indicators. One possible solution to this dilemma is to set thresholds or targets and monitor progress in terms of the index components, which are more directly visible, and use the composite index to demonstrate overall progress and integrate SFM into wider systems.

How to compile a meaningful, balanced and easily understood composite index?

Given the complex reality of sustainable forest management, it is likely that there will be wide differences in concept and measurement between the components, which will complicate the task of combining them into a single index. Whatever the specific transformations necessary, it is necessary to ensure that a good balance is maintained between the different elements of sustainable forest management, and that any index is transparent on the data for individual components, and not a "black box".

7. Options for a global indicator set or index of sustainable forest management

Four options have been developed as a basis for further discussion. They emerge from the data and analysis of the paper. In particular:

- The indicators chosen come from those proposed by the experts (table 1) or the list of 15 indicators on global forest related policy goals, objectives and targets (table 2)
- Every effort is made to learn from experience, and to satisfy the conditions set out in section 3. For instance:
    - The list of indicators is kept short
    - The significance of the indicators should be immediately understandable from their titles
    - The indicators are defined in "scale-neutral" terms: units, ratios and so on are specified, rather than just identifying areas of interest
    - There are strong indications that reliable data on the indicators will be available in the short term for most countries in the world
    - The focus is on indicators whose development can be influenced by policy makers, not on context or descriptive indicators, which cannot be changed in the short or medium term.

At this stage, two major questions are ***not*** addressed, although it will be necessary to address them when agreement is reached on the list of indicators:

- Whether or how to combine the data for the indicators into a single index
- Whether progress towards SFM should be measured in the same way everywhere (common thresholds or benchmarks) or countries should be asked to set their own objectives (in terms of the specified indicators)

The options are set out below, with brief comments on their main advantages and disadvantages. They have been chosen to illustrate different approaches, and could easily be combined. They are:

Option 1: Focus on the seven thematic elements of SFM, with one indicator for each thematic element

Option 2: Focus on policies and institutions affecting SFM, as these are the tools for decision makers, and outcomes will respond with long time intervals.

Option 3: Balance between SFM outcomes and governance indicators. "Legal, policy and institutional framework" is the last of the seven thematic elements, so indicators on policies and institutions could be integrated into a set alongside indicators on the most important measurable outcomes

Option 4: Focus on the SDG 15.2 indicator on SFM. This presents for discussion the proposal submitted to the IAEG in December 2015, which was severely constrained by the nature of the SDG process. However, as this will, if accepted and implemented, strongly influence the wider policy environment, it should be discussed in more depth than was possible in the very short time window available.

Option 1: Focus on the seven thematic elements of SFM

Definition

There would be seven indicators, as follows:

1. Extent of forest resources: annual average % change in area of forest
2. Forest biological diversity: % of forest area which is protected for conservation of biodiversity
3. Forest health and vitality: % of forest area damaged (fire, insects, pollution etc.) plus % of forest degraded.
4. Productive functions of forest resources: annual average % change in volume of growing stock. (As this indicator will have the same development as an indicator on carbon flows, it also refers to one of the main environmental functions of forests – carbon sequestration and storage)
5. Protective functions of forest resources: Mountain Green Cover Index
6. Socio-economic functions of forest resources: Number of forest related jobs (full time equivalents, including subsistence and informal workers) per 1000 ha of forest OR forest related revenue (in monetary terms, including estimates of value for self employed and informal workers) per 1000 ha
7. Legal, policy and institutional framework: Existence of national forest programme, with active participation of civil society, indigenous peoples and the private sector

Measurement and data collection

Some of the indicators are easily available already (1, 2, partly 3, 4, 7), mostly through FAO-FRA. The Mountain Green Cover Index (5) has been proposed for adoption by the UN Statistics Commission in March 2016 to measure SDG 15.4. It will be challenging to specify precisely the indicators for jobs and livelihoods and then collect data on them, and to find an approach which works in all regions of the world.

Advantages

Comprehensive, clear, easily understood, robust, feasible.

Disadvantages

The focus is on outcomes rather than policies, although these are addressed in sub-indicator 7, but with only one indicator. Some of the indicators may be hard to measure in practice, notably on livelihoods and revenue, especially in the many countries where the informal sector is critical for forest livelihoods

Option 2: Focus on policy and institutions affecting SFM

Definition

There would be six indicators, describing the presence or absence of the policy instruments and institutions normally considered desirable to achieve sustainable forest management. This list draws on, but is different from, the indicators used for FRA2015:

1. Existence of policies supporting sustainable forest management, including formal protection of existing forest, or definition of a permanent forest estate in countries where this is necessary, with the institutions and resources necessary to implement these policies
2. Existence of a recent, scientifically sound, national forest inventory
3. Existence of a national forest programme, with active participation of civil society, indigenous peoples and the private sector
4. Percent of forest area under long term forest management plan
5. Percent of forest area with independently verified forest management certification
6. Existence of specific instruments to ensure biodiversity conservation and the protective functions of forests

Measurement and data collection

Information on all six indicators is available, either through international sources, mostly FAO-FRA[20], or by national reporting. The challenge is in assessing the quality and effectiveness of the various instruments. Many of the indicators use a binary approach (presence/absence), so it will be difficult to get differentiated results – especially as most governments would claim they have adequate policies and instruments in place, even when these policies are not implemented properly, or the institutions are not effective.

Advantages

Easily understandable, and linked to actions of policy makers and market actors, rather than outcomes. Focuses on aspects which can be directly influenced by policy makers in the forest sector, who are the principal users of this type of analysis. Feasible.

Disadvantages

Could be misleading, for instance if good policies and institutions are in place, but for other reasons, (lack of resources, social unrest, climate change ...), outcomes are negative. Does not address the important question of resources and investment, because of specification/measurement issues. Very difficult to assess the quality and effectiveness of the policy instruments in question (danger of "Potemkin villages" and "paper parks").

[20] Forest certification trends are monitored by UNECE/FAO in its Forest Products Annual Market Review. National data on area certified are available on the websites of the certification systems.

Option 3: Balance between SFM outcomes and governance indicators

Definition

There are 11 indicators covering all the thematic elements as well as the SFM tools from option 2:

1. Extent of forest resources: annual average % change in area of forest
2. Forest biological diversity: % of forest area which is protected for conservation of biodiversity
3. Forest health and vitality: % of forest area damaged (fire, insects, pollution etc.) plus % of forest degraded.
4. Productive functions of forest resources: annual average % change in volume of growing stock
5. Protective functions of forest resources: Mountain Green Cover Index
6. Socio-economic functions of forest resources: Number of forest related jobs (full time equivalents, including subsistence and informal workers) per 1000 ha of forest OR forest related revenue (in monetary terms, including estimates of value for self employed and informal workers) per 1000 ha
7. Existence of policies supporting sustainable forest management, including formal protection of existing forest, or definition of a permanent forest estate in countries where this is necessary, with the institutions and resources necessary to implement these policies
8. Existence of a recent, scientifically sound, national forest inventory
9. Existence of a national multi-stakeholder policy platform, with active participation of civil society, indigenous peoples and the private sector
10. % of forest under long term forest management plan
11. % of forest area with independently verified forest management certification

Measurement and data collection

All the indicators are already discussed. Difficulties may occur for the socio-economic indicator, but otherwise quite feasible

Advantages

Comprehensive, feasible

Disadvantages

The high number of indicators could cause confusion and mixed messages.

Option 4: Focus on the SDG 15.2 indicator on SFM

(see annex 2)

Definition

There are four indicators as follows:

1. Annual average percent change in forest area over most recent available 5 year period
2. Annual average percent change in stock of carbon[21] in above ground biomass over most recent available 5 year period
3. Share of forest area whose primary designated function is biodiversity conservation, most recent period
4. Share of forest area under a forest management plan, of which forest area certified under an independent forest management certification scheme, most recent period

Measurement and data collection

Data for all of these indicators should be available, either from FAO-FRA or by national reporting.

Indicator 2 could be expressed also in m3 of growing stock. It is open to discussion whether to monitor growing stock (stemwood) or above ground biomass, in m3 of wood or tons of carbon.

Indicator 3, expressed as primary management objective, could be replaced by "area protected for conservation of biodiversity", using IUCN classification, and thus linked to Aichi Target 11.

There is tension inside indicator 4 between notions of management plan and of certification. According to ITTO, about 30% of sustainably managed tropical forests are certified, whereas in developed countries, the proportion is much higher.

Advantages

Robust and simple, measurable (data already available).

Disadvantages

Several aspects of SFM are missing, notably jobs and livelihoods, revenue and valuation of benefits, forest health and vitality, protection function of forests (soil, water, erosion etc.), except in as much as they are reflected in the management plan.

[21] As there is a constant ratio between wood and carbon, the indicator will give the same result for growing stock in m3, which is probably better known and understood in forestry circles, though not elsewhere

8. Conclusions and next steps

It appears that the time is ripe for further progress on developing a common approach at global level to monitoring progress towards sustainable forest management: there is high level policy interest, in the SDG process, at UNFF and elsewhere, data availability and quality are improving steadily, there is now considerable experience with the concept in many forums, as demonstrated by the interviews for this paper, and the cycle for FRA2020 is just beginning, so that the FRA process could be adapted, if considered desirable, to supply data needed for the SFM indicators.

This paper shows that there are several credible technical approaches to the challenge of monitoring and reporting sustainable forest management on the basis of a commonly agreed set of SFM indicators or an SFM index.

The paper has not addressed the issue of a commonly agreed institutional framework for compiling data, analysing and reporting them. There are in fact several possibilities, including using an existing forest sector policy framework, such as UNFF, a more technical forest sector centred process, such as FRA, an ad hoc interagency project, such as the one underlying this paper, or yet another approach. Also, there are a range of necessities with regard to specifications and timing of reporting, which need separate consideration.

Implementing whatever is agreed will certainly take some years, so it is urgent to construct a consensus on how to implement this concept. Agreement would ideally be reached in the first half of 2016, to give a realistic expectation that results would be available at the next UNFF review process and the next FRA, as well as for SDGs.

It is clear that to achieve useful results, it will be necessary to develop political will over an extended period, based on a high degree of consensus, and a consistent approach through discussion of methods, data collection and analysis. In any case, there will be a need for clarity of vision, interagency cooperation and trust, good communication, and adequate resources, over a sufficient period (three to five years from concept to published results).

On this basis, the following process is suggested for the first half of 2016:

- An informal meeting during the UNFF AHEG on 29 April reviews the options proposed by this paper and decides on future action
- This proposal is presented at the meeting of the Montréal Process in Canada in early May
- Further consultations, as needed.
- The draft proposal is tabled at COFO in July 2016. There could theoretically be endorsement/adoption and input to guidance for FRA2020, if not in all details, then at least the collaborative process and interim results

Annex 1: Vision and roadmap presented to the World Forestry Congress in September 2015

Strengthening criteria and indicators for sustainable forest management

and their use in policy and practice:

The Way Forward

Over the last 25 years criteria and indicators for sustainable forest management (C&I for SFM) have become a vital tool for developing a common understanding of the key components of sustainable forest management. They have been adopted and widely applied particularly for international and national reporting and for forest certification. They have undoubtedly helped to define SFM, providing a framework for discussion, and have stimulated improved monitoring.

But they have fallen short of the general ambition to arrive at a commonly agreed global set of C&I for SFM, to use them as a framework to shape policies at different levels and guide management practice, to assess progress towards sustainability, or to improve communication with actors outside the forest sector.

Realizing their full potential on these key areas requires a renewed effort at all levels to further develop and adapt existing C&Is and enhance their use. A new vision is needed, along the following lines**:**

By 2020 criteria and indicators for sustainable forest management are used by decision makers in policy and practice at all levels to:

- strengthen development of results-based forest-related policies, programmes and plans and monitor their implementation;
- promote and provide incentives for the transition to sustainable forestry practices and forest management certification;
- strengthen dialogue with other sectors and to demonstrate the contribution of forests and forestry to sustainable development and the well-being of society; and to
- monitor, assess and report on sustainable forest management and contribute to measuring progress towards more sustainable natural resources and land use.

Ten proposed actions for moving forward mobilizing the full potential of criteria and indicators for sustainable forest management to promote and demonstrate sustainability of forest management

Actions by international and regional bodies:

a. further develop **sets of indicators** to measure and report on sustainable forest management, to demonstrate the contribution of forests and forestry to **sustainable development** and to other sectors, aiming at sets that are simple, clear and easily understood by policy-makers, stakeholders and wider society;
b. further streamline C&I-related data collection, **monitoring and reporting**, building on existing mechanisms and institutional arrangements; and

c. provide broad **access to experiences and lessons** learned using C&I for SFM and support **research and capacity building** on their development and use by different stakeholders, promoting scaling up of successful applications.

Actions by national and/or sub-national governments:

a. promote **results-based** forest-related policy and programme formulation based on agreed C&I sets and develop simple sets of criteria and indicators that can be cost-effectively applied in operational administrative practice, using existing C&I for SFM as a framework;

b. integrate sets of criteria and indicators in the main **instruments used to regulate and guide forest management practices** - in legislation, technical guidelines, financial instruments, and monitoring and evaluation/auditing systems as well as into the **national sustainable development agenda**;

c. further develop mechanisms and tools to provide **incentives for investment** in sustainable forestry practices by communities and the private sector by improving access rights to resources and markets based on the use of criteria and indicators;

d. further strengthen forest-related **monitoring and information systems** aiming to cover key elements of forest sustainability in a cost-effective way, strengthening the evidence basis for governing and managing forests;

e. develop **communication and public outreach** on the contribution of forests and forestry to other sectors, sustainable development, and societal well-being; and include criteria and indicators for sustainable forest management and their use in **research agendas and curricula** in education, training and capacity development.

Actions by non-governmental stakeholders (forest owners, communities, private sector and related producer organizations):

a. develop and use simple sets of criteria and indicators as a reference for guiding **operational managerial practice, in monitoring and in reporting**, using existing C&I for SFM as a framework; and

b. use criteria and indicators as a stepping stone to **forest certification** for non-certified forest enterprises, including forest management concessions and community enterprises.

Annex 2: Proposal for SDG Target 15.2 monitoring submitted by FAO, with support from other agencies in December 2015

Sustainable Development Indicator Target 15.2

Target 15.2	**By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally**
15.2.1	Progress towards sustainable forest management
Definition	"Sustainable forest management" is a central concept for Goal 15 and target 15.1 as well as for target 15.2. It has been formally defined, by the UN General Assembly, as follows: [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*". (Resolution A/RES/62/98) An "index of sustainable forest management" with four sub-indicators can be used as a basic indicator of progress towards sustainable forest management by a country. The four sub-indicators are 1. Annual average percent change in forest area over most recent available 5 year period 2. Annual average percent change in stock of carbon in above ground biomass over most recent available 5 year period 3. Share of forest area whose primary designated function is biodiversity conservation, most recent period 4. Share of forest area under a forest management plan, of which forest area certified under an independent forest management certification scheme, most recent period For each of these components, countries can set national targets, monitor and report on progress. The four sub-indicators will be combined into a single composite index, but targets would be set at the level of sub-indicators. Once targets have been set by national authorities, in terms of the four sub-indicators, and progress measured over an agreed period, countries would assess progress (on track to exceed target, on track to achieve target, progress but at an insufficient rate, no significant overall progress, moving away from target). The final value of the index would be a simple arithmetic average of the values for the four sub-indicators. The use of national targets allows each country to define sustainable forest management for its own specific circumstances, within a coherent international framework. Targets on the sub-indicators can also be set at regional or global levels.
Rationale and interpretation	The definition of SFM by UN GA contains several key aspects, notably that sustainable forest management is a concept which varies over time and between countries, whose circumstances – ecological, social and economic – vary widely, but that it should always address a wide range of forest values, including economic, social and environmental values, and take intergenerational equity into account. Clearly a simple measure of change in forest area, while essential, and used for target 15.1, is insufficient to monitor sustainable forest management as a whole. The index proposed combines the two indicators at present under consideration ("forest loss" and "area certified") with measures of use/degradation (sub-indicator 2), biodiversity conservation (sub-indicator 3) to give a more rounded picture of sustainable forest management. Further "topical" sub-indicators will be needed to provide a more comprehensive assessment of SFM aspects. The significance of

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	the four sub-indicators may be briefly explained as follows: 1. Trends in forest area are crucial for monitoring SFM: clearly, if there is significant uncontrolled deforestation, forest management is not sustainable. The indicator focuses on change as there is no ideal share of forest in land cover, as the share is determined by history, ecological circumstances and competing land uses. The indicator covers the net effect of the other parts of Target 15.2: "halt deforestation" and "substantially increase afforestation and reforestation". However most countries have reliable data on the components of this overall trend (deforestation, afforestation and reforestation), for which separate targets can be specified, if so desired. This component incorporates the concept of "net permanent forest loss" at present classified "green" and is also used for Target 15.1 2. Changes in the stock of biomass are determined by the balance between increase in volume of wood biomass (annual increment) and decrease (natural losses and damage by fire insects etc., and wood harvest). In a sustainably managed forest, increment is more than losses, so that the biomass stock increases, or does not decrease, and carbon is sequestered from the atmosphere. With very few exceptions, a decline in total biomass stocks, even if the forest area does not decrease, implies unsustainable management (and possible degradation). As the wood/carbon ratio is constant, there will be exactly the same trends for carbon stocks as for wood biomass. Therefore a single indicator addresses carbon stocks and flows and trends in growing stock of wood, and may be expressed in m^3 of wood or in tons of carbon. 3. Forest areas managed for the conservation of biodiversity are a proxy for trends in forest biodiversity and a clear indication of political will to incorporate biodiversity into forest management. The CBD Aichi Target 11 calls for each country to conserve at least 17 per cent of terrestrial and inland water areas, so this may be taken as a goal for this element. Work is in hand on developing a number of indicators of forest biodiversity, which may be useful in the future. 4. The fourth parameter looks at the area within a country where a key tool for sustainable forest management is applied. The existence of a "forest management plan" is a necessary tool for evidence based, long term management. Those areas that are certified by third party schemes as being sustainably managed work on the basis of an independently verified management plan. While the latter fulfils a higher standard, it should be pointed out that there are very significant areas of sustainably managed forest which are not certified, either because their owners have chosen not to seek certification (which is voluntary and market-based) or because no credible (or affordable) certification scheme is in place for that area. The latter is true for most tropical countries. For this reason, using "area of certified forest" as the sole indicator could give a misleading impression.
Sources and data collection	Countries, through official government-nominated correspondents, provide data for all four elements through established data collection mechanisms, in particular the Forest Resources Assessment (FRA) of FAO. Most recently published in 2015. Data on the sub-indicators is available from practically all countries and territories, accompanied by extensive metadata on sources, definitions, conversion from

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	national data to international standards and data quality. All FRA data are submitted (and officially approved) by national authorities. To the extent that the indicator uses terms compatible with FRA, comparable data are easily available and national statistical offices can validate and modify them as necessary. Definitions and concepts used for the sub-indicators have been specified and agreed over many years of international collaboration between experts nominated by national governments, international bodies and UN agencies. Data supplied by national authorities follow the agreed FRA2015 terms and definitions, which are now well known and accepted by forest specialists. See Forest Resources Assessment Working Paper - 180: FRA 2015 Terms and Definitions, available at
Comments and limitations	The four elements all address major concerns, but, for conceptual and data reasons, some aspects of sustainable forest management are not included, notably jobs and livelihoods, revenue and valuation of benefits, forest health and vitality, protection function of forests (soil, water, erosion etc.). Regional and inter-regional collaboration between countries has been on-going for around 15 years to monitor aspects of sustainable forest management in more detail, supported by intergovernmental bodies. The sub-indicators used in this context build a solid foundation for the further development of more specific "thematic" indicators. However at present, this more comprehensive approach gives results which are too complex and location specific for inclusion in the global multi-sector SDG indicator set. Forest degradation: UNCCD is working together with FAO on land degradation under target 15.3 so degradation of forest land, as mentioned in Target 15.2 ("restore degraded forests") may be monitored through that indicator. Trends in biomass, especially when put on a per hectare basis, can give some indication of forest degradation. Protective functions of forests: A Mountain Green Index is being developed for Target 15.4. This would also provide relevant information on the protective functions and could at a later stage, be incorporated into the SFM index for Target 15.2.
Data for global and regional monitoring	See also "Sources and data collection". Data can be provided directly by member countries or, if necessary, taken from the FAO database at http://www.fao.org/forest-resources-assessment/explore-data/en/. The parameters chosen are all measured directly at the national level, so countries can easily set their target values. If it is considered desirable to aggregate to the regional or global level, this presents no conceptual problems.
Supplementary information	This metadata sheet was elaborated by FAO in collaboration and coordination through an informal partnership of agencies and processes with relevant experience, including notably FAO, UN Forum on Forests, CBD, UNCCD, International Tropical Timber Organisation, and regional criteria and indicator processes for Europe, Amazon, Congo Basin, low forest cover countries, and the Montréal Process[22] region. The SFM index incorporates in a single framework the two indicators already proposed to IAEG: "net permanent forest loss" (in modified form to address weaknesses of the concept of "net permanent forest loss") "area of certified

[22] Temperate/boreal countries in North America, South America, Russia, Oceania and East Asia.

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	forest", which would not then have to be monitored separately.
References	United Nations General Assembly resolution A/RES/62/98, 31 January 2008 (definition of sustainable forest management, non-legally binding instrument for all types of forest) FAO Global Forest Resources Assessments at http://www.fao.org/forest-resources-assessment/en/