Organization-led Initiative in support of the United Nations Forum on Forests

Development of a global core set of forest indicators to support the implementation of the 2030 Agenda on Sustainable Development and the IAF Strategic Plan

Background paper

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Introduction: objectives of the OLI and of the paper

In recent years, there have been many developments in measuring progress towards sustainable development and sustainable forest management, with complex mechanisms being put in place to fulfil the mandates of a wide variety of global and regional organisations, all in the interest of truly evidence based policy making and improved communication at all levels. 2016 presents both a challenge and a window of opportunity for the forest sector: a review and follow-up mechanism is being put in place for the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs) contained therein, the International Arrangement on Forests has been reviewed and a vision, objectives and Four-Year Programme of Work are under discussion while the planning of the next global Forest Resource Assessment (FRA 2020) has started. There is significant potential for finding major synergies between these – and other - processes, on the conceptual and practical level, but this potential can only be delivered if all actors cooperate, well in advance of the operational phase. This is the thinking behind the Organisation-led Initiative (OLI) which will take place in Rome from 28-30 November 2016.

The main objectives of the OLI, according to the concept note, are:

- *to propose a common and concise set of global indicators for monitoring progress in achieving the forest-related targets of the SDGs and relevant goals and targets of other forest-related global processes;*
- *to provide inputs to the development of a proposal on cycle and format for reporting;*
- *to provide inputs and guidance to the process of developing FRA 2020 in order to ensure its continued relevance as a global source of forest information.*

As the OLI does not have any formal status, it can make proposals but decisions must be made according to the mandates of the various agencies involved.

The objectives of this paper are to provide the necessary background information for the OLI in a convenient form and, above all, to submit proposals as a stimulus to the discussions at the meeting. These proposals are based on previous work, of all the relevant organisations, and of the informal interagency working group which has met to further this work. However, they do not represent a formal proposal by the organisations leading the OLI, but a contribution to the meeting's discussions. Given the complexity of the issues and the number of actors, the OLI does not seek to achieve consensus on every detail of the proposals, which must in any case be formally submitted to, and approved by, the appropriate decision-making bodies, including those which sponsored the OLI. However, progress on these matters would be faster and smoother if the OLI – which brings together all relevant actors - could agree on the broad lines of the next steps, identifying main areas of agreement and, perhaps, of disagreement.

This background paper has been prepared by a consultant, engaged by FAO, and was reviewed by all the OLI sponsoring organisations, but does not represent the official position of any organisation. It is structured to introduce each item on the OLI agenda, providing relevant information, and, where possible, putting forward suggestions for discussion by the participants in the OLI.

Background

This section briefly summarises recent main developments in fields relevant to global forest related indicator sets. A distinction is made between "users" of forest related information, such as the 2030 Agenda for Sustainable Development, or the International Arrangement on Forests, as well as other bodies like UNFCCC, CBD and UNCCD, who could benefit from a global core set of forest-related indicators, and those who would carry out the information collection, such as FAO (e.g. FRA), the UNFF, UNFCCC, CBD or CCD secretariats, ITTO or regional C&I process secretariats for regional reports. The interagency group presented below brought together these two groups. Speakers from the relevant organisations will present more detailed information to the OLI, so only a very brief summary is presented here.

2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs)

The 2030 Agenda and the SDGs are at the heart of the global development agenda. There are several targets and indicators relevant to the forest sector; they include not only very specific forest indicators but also a wider range of indicators relevant to the forest sector. At present the UN Statistical Office with national statistical offices, working through an "Interagency Expert Group" (IAEG), has agreed on indicators for all the targets, and has assigned each indicator to a "tier"[1] It is setting up a system to provide annual monitoring of progress towards the SDGs, for instance by identifying a "custodian" agency/agencies for each indicator to support the process.

Two indicators refer directly to forests:
SDG indicator 15.1.1 Forest area as a proportion of total land area is the same as in the Millennium Development Goals, its significance is clear and there are well established monitoring methods, notably the FRA. It is assigned to Tier 1.

SDG indicator 15.2.1 Progress towards sustainable forest management. A proposal based on the work of the interagency group was submitted in December 2015, accepted by the IAEG but assigned to Tier 3. A revised proposal, addressing the issues raised was submitted to the IAEG on 14 November 2016, in the hope that the indicator status will be revised to Tier 1. The revised indicator includes 5 sub-indicators:

1. **Forest area annual net change rate**
2. **Above-ground biomass stock in forest**
3. **Proportion of forest area located within legally established protected areas**
4. **Proportion of forest area under a long-term forest management plan**
5. **Forest area under an independently verified forest management certification scheme.**

In submitting this proposal, its authors recognised that as an indicator, which must be measurable and simple, it did not reflect all aspects of sustainable forest management[2], but provided a feasible and meaningful indicator. The proposal submitted to the IAEG on 14 November, including methods and definitions is reproduced in annex 4, and will be presented at the OLI, along with the reaction of the IAEG.

A number of other SDG indicators also have links to forests, either because forests account for a significant part of the aspect to be measured (e.g. wood is a major renewable energy) or because the aspect being monitored could also be monitored inside the forest sector, using the same approach (e.g. proportion of degraded land). These topics were reviewed by the interagency group and a summary table of SDG indicators relevant to forests, as identified in the paper prepared for the interagency group is presented in annex 1. They cover a wide range of topics of varying priorities.

International Arrangement on Forests (IAF)

Under ECOSOC Resolution 2015/33, a Strategic Plan for the IAF for the period 2017-2030 and a four-year programme of work should be agreed by the UNFF session in 2017. The purpose of the Strategic Plan is to enhance the coherence of, and guide and focus the work of the IAF and its components in advancing the vision, missions and objectives of the IAF. Negotiations on these interlinked questions are taking place in an Ad Hoc Expert group (AHEG) in 2016 and in a Working Group in 2017, and will not be complete before the OLI. However, one of the core functions of the UNFF is to "promote, **monitor** and **assess** the implementation of sustainable forest management", and any outcome of the IAF process will certainly include provisions for monitoring progress towards sustainable forest management, notably the Four Global Objectives on Forests,

[1] Tier 1: Indicator conceptually clear, established methodology and standards available and data regularly produced by countries.
Tier 2: Indicator conceptually clear, established methodology and standards available but data are not regularly produced by countries.
Tier 3: Indicator for which there are no established methodology and standards or methodology/standards are being developed/tested.

[2] "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.)."

and on implementing the UN Forest Instrument. Member states are expected to submit, on a voluntary basis, national progress reports to even-year sessions of the Forum, starting in 2018, and the Secretariat, in collaboration with CPF members, may prepare a quadrennial global publication on the state and implementation of the UNFI, including progress towards the global objectives and forest related SDGs and targets, beginning in 2021.

Therefore, it is already clear that a major effort will very probably be put in place to monitor and assess sustainable forest management at a global level, with the first major output in 2021. Given the long lead times involved (formulation of enquiries, collection, review and revision of data, analysis, review), it is already time to consider the scope of the enquiries, definitions and sharing of responsibilities, as these must all be agreed before work starts (see discussion of roadmap later in this paper). Although the reporting format has not yet been agreed, guidance on what should be monitored is available from many outputs of the IAF, notably the four Global Objectives and the seven thematic elements of sustainable forest management (listed in annex 2), all seen in the context of the UNFI.

Other international processes relevant to the forest sector

There are several other major processes which are relevant to the forest sector, and have monitoring and reporting processes incorporating forest related information. It is not possible to describe these processes in detail in this paper, but they were taken into account in preparing the list of indicators.

In particular:

- Under the UNFCCC and the Kyoto Protocol, developed countries report annually their greenhouse gas inventories, including on carbon stocks and flows in forests, provide national communications once every 4 years followed by biennial reports (BR) every 2 years following methodological guidance by the IPCC. Developing countries also submit their national communications once every 4 years (but they have more flexibility and LDCs are given more flexibility in submission timeframes). Under the Kyoto protocol, developed countries submit supplementary information on their land use, land-use change and forestry activities. The Paris Agreement has established a transparency framework, but its modalities, procedures and guidance are still to be negotiated

- For CBD: Forest areas conserved for biodiversity as well as forest sustainably managed are included in the Aichi Targets and reporting under the CBD. Targets most relevant to forests include:
    - T5 Habitat loss halved or reduced (*By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced*)
    - T7 Sustainable agriculture, aquaculture and forestry (*By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity***)**
    - T11 Protected areas increased and improved (*By 2020, at least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape*)
- For UNCCD: Parties submitted national reports to the Fifteenth session of the Committee to Review Implementation of the Convention (CRIC 15) in October 2016, as preparation for the Conference of the Parties in Autumn 2017, which will review and revise the strategy of the Convention. One of the mandatory questions for the national reports concerned land cover status, and the importance of forests in combating desertification is stressed in UNCCD activities. SDG indicator 15.3.1 addresses Proportion of land which is degraded over total land area.

Forest Resource Assessment (FRA)

The first World Forest Inventory was organised by FAO in 1948, and since then FAO has regularly provided comparable global data on forests, now at five-year intervals, the latest in 2015. The earliest inventories focused on forest area and wood volume and in the 1990s focused on deforestation and its drivers. From about 2000, FRA attempted to assess the sustainability of forest management, structured around the seven thematic elements agreed by UNFF, using the "traffic lights" method, based on whether selected indicators were negative, positive or stable. FRA 2015 presented sustainability indicators, including on sustainable forest management, the latter covering (as a series of "filters") permanent forest use, SFM policies and legislation, stakeholder participation, forest inventory and reporting, forest management plans, soil and water conservation, and conservation of high conservation value forest.

FRA uses a wide variety of methods, including remote sensing, but the core remains a close dialogue with official national correspondents, based on agreed definitions and a detailed enquiry. The same information is requested from all countries and territories in the world. In FRA 2015, a Collaborative Forest Resource Questionnaire was used, whereby FRA cooperated with a number of partners, including regional criteria and indicator processes, to collect and share data, reducing the reporting burden – although this burden remains heavy. There is a detailed and careful process of consultation on the methods and definitions, starting well before the enquiry is finalised and distributed. The FRA2020 process started in 2016, with evaluation of FRA 2015, an internal consultation process and the first meeting of the FRA Advisory Group.

International Tropical Timber Organization (ITTO)

In order to assess the progress toward the achievement of sustainable forest management in the tropics, ITTO estimated the area of natural forests that was reasonably considered under sustainable forest management in ITTO producer member countries by carrying out a survey called "Status of Tropical Forest Management 2011 (SFM Tropics 2011)". The survey covered all 33 ITTO producer member countries in 2010, which together occupied 80% of the world's tropical forests. The survey was based primarily on the data collected in 2010 using the "Revised ITTO Criteria and Indicators for the Sustainable Management of Tropical Forests" published in 2005 (Revised ITTO C&I).

The estimates were derived for the natural-forest production permanent forest estates (PFE) by aggregating the areas of the following: 1) forest management units where independent certification had already been practiced or demonstrable progress had been made towards such certification; 2) forest management units where long-term forest management plans for periods of ten years or more had been fully developed and effectively implemented; 3) model forest units where information was available on the quality of management; and/or 4) community-based forest management units with secure tenure and a known high quality of forest management.

With regard to the protection PFE, estimates were also made based on the areas: 1) with secure boundaries and management plan; 2) generally considered well managed; and 3) not under significant threat from destructive agents.

The estimates published should be considered conservative, as they included only the areas where reliable information was available about the quality of forest management.

In addition to the country reports on the Revised ITTO C&I, various information was used in carrying out the SFM Tropics 2011 assessment. These include, among others: FRA 2010, country reports to the World Bank's Forest Carbon Partnership Facility (FCPF), web-based datasets maintained by IUCN and UNEP-WCMC, information obtained through ITTO diagnostic missions, ITTO C&I workshops and ITTO field projects, as well as communications with organizations and individuals with specialist knowledge.

Regional criteria and indicator (C&I) processes

From the mid 1990s, regional processes, in various different formats, and using a variety of approaches, addressed the promotion of sustainable forest management, notably through agreeing on regional sets of criteria and indicators. The process of reaching consensus on these sets had a major influence on defining in practice, and at the regional level, in a transparent and objective way, what constitutes sustainable forest management. The sets have been used to assess the sustainability of forest management (at national and management unit level), as a framework for research or statistical reporting, and as a basis for high level policy commitments. These processes have been very influential in stimulating and articulating sustainable forest management, as well as for monitoring and communication, and to develop an expert community on SFM. Despite the wide (and justified) differences between regional C&I sets, it became apparent that the main features of sustainability were similar in all regions: this was the basis of the seven "thematic elements" defined by UNFF.

There has been increasing "horizontal" communication and cooperation between regional processes, for instance on the CFRQ.

Informal interagency group on indicators to monitor progress towards SFM and forest-related SDG indicators

An informal interagency group has brought together representatives of agencies which have an interest in monitoring SFM, whether from a forest sector perspective, or from other perspectives[3]. The group felt there was a challenge and a window of opportunity arising from multiple demands for a transparent and simple monitoring process, notably from the SDG process and the IAF review process, which coincided with the end of one FRA cycle and the beginning of the next. Better coordination, by focusing on a smaller number of indicators, agreed on by all concerned, and coordinating data collection and sharing – always within the mandate of each organisation – could increase data quality, simplify "story telling" and reduce the reporting burden. An agreed global core set of forest-related indicators would be the foundation of this effort. The group first met at the World Forestry Congress in 2015, and for a second time around the first session of the open ended Ad hoc expert group (AHEG) of UNFF in April 2016. It commissioned a review of approaches used so far in international reporting on SFM, and on this basis, as well as interviews with a wide range of experts, identified possible components of an indicator set, and proposed options for a global indicator set. This paper is available at http://www.cpfweb.org/92395/en/. The present paper is based on the work of the interagency group, and builds on earlier proposals, revised in the light of the comments by members of the interagency group.

The interagency group also played a key role in formulating the proposal for SDG indicator 15.2.1

Why develop a global core set of forest-related indicators?

What would be the benefits of a global core set of forest indicators? A global core set would provide a framework for the collection and analysis of information to fulfil the mandates of major international agencies and processes, notably the IAF and the 2030 Development Agenda, as well as reporting for the Rio conventions, and be accompanied by an agreement between agencies and national correspondents as to how the information should be collected and shared. The benefits can be summarised as follows:

- Better, more understandable, more comprehensive, information for policy makers, in the forest sector, in other sectors, and at the national, regional and global levels;
- A clearer, more understandable, and less contested, "story" about developments in the forest sector, and better understanding of forest related issues by the general public;
- A more holistic approach, as debates are not constrained by data sets limited to one particular aspect.

[3] Agencies participating in one or more meetings included UNFF, FAO, CBD, ITTO, UNFCCC, UNSD, IUFRO, UNCCD, Montréal process, Forest Europe.

- A shift in the policy debate away from data problems towards addressing the search for solutions;
- More synergies and better coordination between agencies in planning and implementing action and investment programmes
- Significantly reduced reporting burden, at the national level: information to be provided only once, and the same information to be held in all international data banks.
- A consistent framework for presenting and analysing information, and for research.

What are the major obstacles to developing a comprehensive global set of forest indicators?

- The many improvements in information and analysis over the last two decades have not been tightly coordinated: there has been a major (and worthwhile) investment in systems which are suited to their specific objectives, but are not completely compatible with each other. Reaching agreement on a global set will involve compromise, and the loss of data continuity in some areas. In some cases, there may be problems at a more formal level, for instance when concepts and definitions are "hard-wired" into mandates or other formal commitments, limiting the potential for adjustment to the needs of partners.
- Different perspectives, perceptions, values and interests on forests by different groups of experts, scientists, stakeholders, civil society and policy makers from a wide range of intellectual backgrounds. Different approaches are inevitable, so sensitivity and open minds will be required to reach agreement.
- There are real differences on the ground between forests in different regions, as demonstrated by the articulation of indicator sets by regional C&I processes. A global core set must identify the common features, of global importance, while providing a common framework within which national and regional data can be collected and analysed.

To overcome these obstacles, and achieve the benefits of a global core set of indicators, advance planning is essential, as well as transparency as regards objectives, methods and data. Sensitive understanding of the mandate, goals and potential of all "players", as well as flexibility, are also essential. This paper, and the OLI itself, try to bring together what has been done so far in this direction, make preliminary suggestions and propose a roadmap for the future. However, it can only be the first step in a process.

There are, of course many examples already of interagency coordination, notably the Joint Forest Sector Questionnaire, the Collaborative Forest Resource Questionnaire, as well as data collected in one context being useful elsewhere. For instance, data on harvested wood products, when required in the UNFCCC context, are often estimated on the basis of data collected through the Joint Forest Sector Questionnaire.

Some remarks about the scope and definition of the global core set:

- There would be several users of the core set, each of whom would focus on different aspects in accordance with their mandate. Some of these would find it necessary to add indicators to achieve their own objectives, and some would find parts of the core set unnecessary for their purposes. For the reasons outlined above, there are many advantages to using the same list of central indicators, with common definitions and streamlined data collection: however not all organisations would use exactly the same list. For that reason, the term "core set" is preferred in this paper (rather than "common set")
- As pointed out above, there are many and various overlaps and interactions between "pure" forest information, and information in some way related to forests which is required for purposes which include forests alongside other ecosystems, land-uses and economic sectors. It would be difficult and counterproductive to attempt a strict definition of where the boundaries should be set for this approach, so the loose term "forest-related" is used below.
- This paper and the OLI focus on the needs of the global community, notably of the various agencies of the UN system. It is intended therefore that all the indicators proposed are relevant to all parts of

the world, to some degree at least. Regional organisations (such as the C&I processes), and those with a specific focus will have their own needs, and will probably wish to add indicators of specific importance to them, while maintaining the core set.

Requirements for a global core set of forest-related indicators

The paper presented to the interagency working group in New York in April 2015, reviewed in some detail the approaches used so far in international reporting on sustainable forest management, and proposed possible components for a global set of indicators, on the basis of international experience and interviews with representatives of agencies playing a significant role in monitoring forests at the global and regional level. On that basis it proposed four options which were considered at the meeting of the interagency group and a subsequent meeting of C&I processes held in Ottawa. The information and analysis in the 2015 paper is not repeated here, but is the basis for the proposals below, which also take into account proposals made during the review.

This section discusses the requirements for a global core set of forest-related indicators, to satisfy the following purposes:

1. To measure progress towards sustainable forest management (including SDG 15.2.1)
2. To measure progress in implementing the UN Forest Instrument, notably the Global Objectives on Forests
3. To measure progress towards SDG targets other than 15.2.1, as well as internationally agreed goals on forests in other instruments than the SDGs and the IAF, notably meeting the reporting needs of the Rio conventions,

Each of these major processes and instruments will make their own decisions about how progress in their field will be monitored, on the basis of their own mandates. The paper will propose in the next section a global core set to provide a common framework to achieve all three of the objectives listed above.

If agreement is reached on a global core set of forest-related indicators, those organisations and processes whose responsibility is data collection can work together to put in place data collection and reporting systems which collect the core information as efficiently and consistently as possible, reducing the reporting burden and presenting the same basic set of official, and validated information to all the major processes.

This paper does not go into questions of definition and terminology – at this stage, the discussion should be on a more conceptual level – but it does use, to the extent possible, the terminology and concepts developed over the years, notably in the FRA, UNFF and the regional C&I processes. This terminology is the result in some cases (e.g. the definition of "forest") of decades of international consensus forming, and should be maintained to the extent possible, while still satisfying the increasingly ambitious objectives of the new global processes.

All proposals should satisfy the following criteria:

- 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, not absolute areas or volumes
- It is not satisfactory just to identify areas of interest, a true indicator must be defined
- 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.

It is stressed that the proposals below are intended to start a process of discussion and consensus forming, and are not a formal suggestion by any organisation. They take into account experience of the past, and views expressed by a variety of actors, but do not have any official status.

This section briefly summarises the main background features of how to achieve the three objectives outlined above, while the next section proposes a global core set of forest-related indicators covering all three

Requirements for a global core set of indicators to measure progress towards sustainable forest management.

There have been many definitions of sustainable forest management, with varying emphasis. However all include the concepts of a balance of dimensions (economic, social and environmental) and of intergenerational equity. Sustainable forest management 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). Regional processes have defined large numbers of criteria and indicators of sustainable forest management, which vary widely in their content and approach. Data have been collected and reported in a wide variety of formats, each adapted to its circumstances. The need therefore, at this stage is to find a rather small number of indicators which, taken together, can monitor progress towards the complex objective.

At the global level, based on the regional experiences, seven thematic elements have been defined, which provide a common, widely accepted framework for sustainable forest management (the seven are listed in annex 2). In addition, it is necessary to consider whether monitoring should focus on "outcomes" (measurable trends, such as changes in forest area), or on the policies and institutions which affect sustainable forest management. The latter are the tools whereby the organisations addressing sustainable forest management may achieve their goals.

The paper for the interagency group suggested four options for a core indicator set

1. Focus on the seven thematic elements of SFM
2. Focus on policy and institutions affecting SFM
3. Balance between SFM outcomes and governance indicators
4. Focus on the SDG 15.2.1 indicator on SFM

The last option is no longer considered as the proposal made has now been included in the SDG process (subject to minor revision). Furthermore, it is accepted that because of the strict demands of the SDG process this indicator set is rather too narrow (only 5 sub-indicators) to reflect the full range of sustainable forest management. Nevertheless, all the options should retain the basic components of the SDG 15.2.1 indicator, in the interests of simplified and coherent reporting and uniformity of approach between international processes.

After discussion at the interagency group, there appears to be a consensus to include both outcomes and governance indicators in the core set. A core set of 11 indicators is therefore proposed to monitor progress towards sustainable forest management. The first seven correspond to the seven thematic elements, while the last four provide more information on key policy instruments: forest inventory, multi-stakeholder platform, long term management plan, certification. Given the importance for sustainable forest management of balance between "pillars" of SFM, and of a holistic approach, these eleven indicators should be seen as a balanced set: to remove one or the other could generate an imbalance, if not compensated by an addition. Indeed eleven indicators may be considered the bare minimum to monitor sustainable forest management.

Requirements for a global core set of indicators to measure progress in implementing the UN Forest Instrument, notably the Global Objectives on Forests

In the UN Forest Instrument, member states and the UN system committed to achieving the four global objectives on forests (listed in annex 2), which are much more policy oriented than the broad areas listed

under the seven thematic elements. They centre on sustainable forest management[4], and so can to a large extent be measured by the list of indicators for sustainable forest management.

The Global Objectives do however introduce some concepts which are not addressed, or only partially addressed, in the list above. Therefore, in order to widen the indicator set to include all the areas addressed by the Global Objectives, it would be necessary to add four indicators: forest degradation, livelihoods of forest dependent peoples, official development assistance and finance for SFM from all sources

Requirements for a global core set of indicators to measure progress towards SDG targets other than 15.2.1, as well as internationally agreed goals on forests in other instruments than the SDGs and the IAF

Increasingly, broad policy objectives have major consequences for forests and sustainable forest management. There are many examples of this, including poverty reduction, biodiversity conservation, food security and climate change. In some cases, organisations have made commitments which commit the signatories to certain forest related actions. Examples would be commitments to conservation of ecosystems for biodiversity under the CBD, achieving land degradation neutrality under the UNCCD, and climate change mitigation and adaptation actions in the land-use sector (AFOLU/LULUCF), including in the context of "Nationally Determined Contributions" of the Paris Agreement under the UNFCCC. In the interests of streamlined reporting and analysis, reduced reporting burden and consistent policy making across sectors, it is clearly desirable that progress towards these objectives should be monitored in a consistent way, in forest and non-forest contexts, with full participation of all involved, and with full sharing of the data collected.

Annex 1 lists those SDGs which have a link to forests, either in that achieving the objectives would influence forest policy (e.g. conserving forests for biodiversity) or that the same approach could be applied in the forest sector as in the broader society. It also proposes possible forest indicators to address the same issues. This list is based on another paper prepared for the interagency working group.

Another emerging area with monitoring challenges is the green economy (similar concepts are "circular economy" and "bioeconomy") and the forest sector's role in it. Despite the ongoing discussion about how "green economy" should be defined, green growth/green economy indicators, have been developed by OECD, UN Statistical Office, Eurostat etc. and differ significantly from those designed to measure sustainable development and sustainable forest management, with greater emphasis on productivity and efficiency in the use of resources, on combining physical and monetary units (green accounting/System of Economic-Environmental Accounting) and on innovation[5]. Given the very long lead times for many forest-related indicators, it would be prudent to take some preparatory measures to address how to measure in the future the progress of the forest sector towards a green economy.

There are problems of fixing boundaries for the core set of forest related indicators, as it would be easy to generate a wish-list of hundreds of interesting indicators to link up with major developments in other sectors. However it is clearly necessary to keep the core set of indicators within tight limits. All of these indicators should be developed in close cooperation with the appropriate agencies, which may be in a position to supply relevant forest related information from data already collected and analysed. An example would be carbon stock changes in the forest sector which are already being collected in the context of national greenhouse gas inventories under the UNFCCC. Six forest related indicators are therefore proposed on topics related to goals other than sustainable forest management and the implementation of the UNFI (narrowly defined), covering

[4] In the text of the four Global Objectives, the terms "sustainable forest management" or "sustainably managed forests" occur five times, and Objective 2 essentially restates the main features of sustainable forest management ("forest-based economic, social and environmental benefits")

[5] See for instance the Workshop on measuring the value of forests in a green economy, organised by ECE/FAO on 21 October 2016 at http://www.unece.org/forests/valueofforestsgreeneconomy.html#/

labour productivity, energy, recycling, carbon stocks and flows, importance of illegal logging/trade and payments for ecosystem services.

Proposed global core set of forest related indicators

Combining the suggestions above, which address sustainable forest management, the four global objectives and a wider set of forest related indicators, gives the following list of 21 indicators. The five sub-indicators proposed to monitor progress towards sustainable forest management under SDG 15.2.1 are shown in ***bold italic.***

	Indicator/unit	Comment
	Core set for sustainable forest management	
1	***Forest area net change rate (%/year)***	Sub-indicator for SDG 15.2.1. Most basic indicator (see also SDG 15.1.1). Regularly reported, notably through FRA
2	***Proportion of forest area located within legally established protected areas (%)***	Sub-indicator for SDG 15.2.1. Relevant also to CBD. Notion of "protected" preferred to notion of "primary designated function" as used in FRA 2015.
3	Forest health and vitality: % of forest area damaged (fire, insects, pollution etc.)	Problems arise as different "damage" measured in very different ways (risk of overlap). Some "damage" is also normal in any ecosystem.
4	***Above-ground biomass stock in forest (tonnes/ha)***	Sub-indicator for SDG 15.2.1. Well known indicator. Reduction in total growing stock indicates overcutting, forest damage or deforestation
5	Protective functions of forest resources: Mountain Green Cover Index	Index under development in FAO measures capacity of mountain ecosystems to maintain their protective functions.
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	Challenges are to collect data, as well as to cover informal employment. Care is needed in analysing significance of trends (job losses v. higher labour productivity)
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	Concepts used and defined in FRA 2015, although challenge remains of distinguishing effective from ineffective policy instruments
8	Existence of a recent, scientifically sound, national forest inventory	A forest inventory is an essential tool for evidence based policy making in the sector. Data on forest inventories available through FRA 2015
9	Existence of a national multi-stakeholder policy platform, with active participation of civil society, indigenous peoples and the private sector	Data collected on this in FRA 2015 although problems persist in separating genuine participation from superficial participation
10	***Proportion of forest area under a long term forest management plan (%)***	Sub-indicator for SDG 15.2.1. Long term forest management plans defined in FRA 2015
11	***Forest area under an independently verified forest management certification scheme (ha)***	Sub-indicator for SDG 15.2.1. Data available for international certification systems from their websites. In FRA2015, correspondents also reported on national independent schemes
	Supplementary indicators for monitoring GOFs	
12	Percentage change in area of degraded forest	Major problem in concept and measurement of "degraded forest"

13	Percentage change in the number of forest dependent people	Challenge to a) define and b) measure "forest-dependent" people
14	Percentage change in official development assistance for sustainable forest management	Tracked by OECD DAC. Several reports exist
15	Financial resources from all sources for the implementation of sustainable forest management ($/ha of forest)	Should include official development assistance, government support, investment by forest owners (private, community or corporate) and investment by financial institutions. This would necessitate a completely new approach and the use of new data sources, based on socio-economic surveys, similar to those carried out for agriculture
	Supplementary forest related indicators	
16	Volume of wood harvested per 1000 forest workers (m3/1000 workers)	Concept of labour productivity important for socio-economic analysis as well as efficiency of sector.
17	Share of wood based energy in total primary energy consumption, of which in modern clean systems (%)	It would be necessary to have a breakdown between modern/efficient wood energy use and traditional wood energy systems, where often wood is burned inefficiently and with considerable pollution
18	Recovery rates for paper and solid wood products (volume recovered for re-use as % of volume consumed)	Important indicator for circular economy, and to demonstrate sustainable management of sector as a whole
19	Carbon stocks and carbon stock changes in forest land: net forest GHG sink/source of forests, forest carbon stock, carbon storage in harvested wood products (Tons C)	Available from national GHG inventories under UNFCCC. No need for separate data collection
20	Proportion of traded/consumed forest products derived from illegal logging or trade (%)	Clear measurement issues: however SDG 15.7.1 Proportion of traded wildlife that was poached or illicitly trafficked has a similar approach and methods could perhaps be developed, in cooperation with partners with experience in this area.
21	Value/number of systems in place for payment for ecosystem services (PES) related to forests (number of systems, value of payments, as ratio to total forest area or area of forest covered by such PES)	PES will be a fundamental feature of the forest sector in the emerging green economy, and the sector should consider putting itself into a position where it can monitor these developments. Methodology and reporting systems would need to be developed.

Roadmap of the path towards a global core set of forest-related indicators

The roadmap for agreeing on a global core set of forest indicators must take into account the timing and milestones of the following major processes:

- The monitoring of Agenda 2030, which foresees annual reporting and quadrennial Global Sustainable Development reports (General Assembly resolution 70/299). The SDG indicators, including 15.2.1, will be finalised very soon, and there will be little opportunity to modify them for a decade or so. Thus whatever is agreed under 15.2.1 will have to be incorporated into the monitoring framework (the proposed core set is exactly the same as the proposal to the IAEG for 15.2.1 on 14 November).
- Under the plans for monitoring progress under the UNFI and the IAF (not yet completed), it is proposed that a progress report would be prepared in 2021, which would require countries to report according to an agreed format, with data to be available for analysis by 2020. Some of the agreed

indicator information, for instance on policies and institutions, might be collected through these channels, especially as the core set takes account of IAF needs. Given the lengthy lead times for agreeing international enquires, and the annual sessions of UNFF, the indicator set should be available in 2017 or 2018.

- UNFCCC/Kyoto Protocol reporting, with, for developed countries, annual GHG reporting, biennial reports, and national communications every four years, and more flexible arrangements for developing countries, as well as supplementary information on land use, land-use change and forestry activities for developed countries. The modalities of a transparency framework for the Paris Agreement have not yet been determined but will probably involve regular reporting, including on forest related topics
- Under CBD, Parties report to CBD at the biennial Conferences (COP 13 in December 2016) and Global Biodiversity Outlook is prepared, on a four year cycle (GBO-4 issued in 2014). A list of biodiversity indicators has been prepared and will be submitted to the COP in December. It is coordinated with the SDG indicators and includes SDG indicators 15.1.1 and 15.2.1 relevant to forests
- Under UNCCD, after the Committee to Review the Implementation of the Convention (CRIC) in October 2016, the Conference of the Parties will decide on strategy and vision for the period 2018-2030 in autumn 2017. The first Global Land Outlook will be issued in 2017 and will presumably include some forest related information.
- The process to prepare FRA 2020 started in 2016. Before data collection can be completed, enquiries must be agreed, with detailed definitions to be applied by national correspondents, and a significant effort in capacity building. To circulate an enquiry in, say, 2018, its main lines should be agreed in 2017.

The challenge for the roadmap on a core set of indicators to support data collection and analysis by a wide range of bodies, is that full agreement must be reached on the core indicator set BEFORE the work of designing enquiries, contacting correspondents etc. can start. Once these complex data collection processes are launched, it is not easy to change definitions, add questions or correct data to fit a changing international environment, especially if different partners are using different approaches or conducting separate data collection efforts (which cannot, unfortunately, be ruled out). Therefore despite the importance of giving sufficient time for wide consultation and discussion, in order to achieve a solid consensus, the roadmap to be proposed is quite demanding and rather compressed in time.

In fact, there are two time scales to be considered:

- An operational time scale for the creation, putting in place and implementing a global core set of forest-related indicators, with outputs around 2021;
- A longer time scale in which the concepts and data can be improved, notably through improvement of the socio-economic indicators.

The two time scales overlap, but external constraints for the first (operational) time scale will ensure that indicators are agreed and implemented before all related challenges can be resolved.

We propose, for the consideration of participants at the OLI, the following roadmap *for the operational time scale*:

November 2016 Organisation-led initiative to launch the process

Winter 2016/spring 2017 Consultation between agencies, OLI participants and other stakeholders with the aim of agreeing on a global core set of indicators, and presenting the proposal for review to the UNFF, SDG/IAEG, FRA Advisory Group, and relevant bodies under the Rio conventions

Summer 2017 Agreement by all active partners on definitions, distribution of labour, communication, data sharing, timing, responsibility for communications with countries, review and revision of data, maintenance of database(s)

Summer 2017 to summer 2019: data collection, review and revision, including checking and endorsement by countries. Experience with FRA shows that two years is a minimum if this complex process is to be completed while maintaining quality and carrying out in-depth dialogue with national correspondents

End 2019 Data collection completed

Outputs:

- SDG reporting (**annual**), Special interim arrangements would have to be made for the SDG indicators as they are constructed around an annual reporting timetable, while forest data are usually collected and reported at longer intervals (e.g. five years for FRA)
- UNFF "quadrennial global publication on the state of implementation of the UNFI, including progress towards the GOFs and forest related SDG and targets, **beginning in 2021**[6]",
- Reporting under other Rio conventions, for instance
    - the CBD flagship publication, Global Biodiversity Outlook, which monitors progress towards the Aichi Targets, of which three (T5, T7 and T11) refer to forests
    - Reporting under UNFCCC (annual, biennial and quadrennial reports)
    - Global Land Outlook under UNCCD
- FRA **2020,** which is an output in itself, as well as input to other monitoring efforts. .

As regards the *longer time scale*, a number of issues should be addressed in depth, under the leadership of the expert and research community, before proposals are submitted to the policy level. These issues are summarised in annex 3.

Streamlining monitoring, assessment and reporting at global (and regional) levels

A truly streamlined monitoring system at global level would have several elements[7]:

- Agreement on a core set of indicators which satisfy the needs of all "players" (including non-forest sector agencies e.g. for the SDGs): if those needs are not satisfied, organisations will naturally put in place a non-coordinated system to collect the information they need, thus preventing streamlining.
- The indicators are all clearly specified and defined, and there has been capacity building with national correspondents to ensure these definitions are feasible and acceptable
- There is a clear distribution of labour between partner organisations as regards methods of data collection, areas of responsibility (e.g. countries to be approached, using what channels) timing, data verification and distribution.
- Whereas the collection, review and revision of data would be carried out only once on behalf of all relevant organisations, each organisation would have responsibility for producing the outputs necessary to fulfil its mandate. Thus the same figure, endorsed by national correspondents, would appear in reports to all partner organisations. The analysis would be specialised on the area of activity

[6] On the assumption that 2021 refers to issue of the publication, not start of the work to prepare it, this would mean analysis would have to be complete by mid 2020, especially if there is some sort of intergovernmental review of the report.

[7] This section is based on the consultant's experience with the Joint Forest Sector Questionnaire (JFSQ), which has been widely welcomed as an exemplary instance of inter-organisation cooperation. However, the JFSQ addresses information which is less complex and less sensitive than the areas which would be covered by the global core set of forest-related indicators.

of each organisation, but there need be no controversy about the underlying data, which would be the best possible, clearly documented and the same in a wide range of outputs, each tailored to its specific objective.

To achieve this, certain conditions must be satisfied. It is essential that all arrangements fully respect all partners, and provide outputs that enable them to carry out their mandated tasks – if not, some parties may be tempted to withdraw from the system. Close cooperation on matters of detail (definitions, enquiry design, including logos, data base structure and many other aspects) between partner agencies is indispensable, as this is the best way to establish the mutual trust which is essential to these arrangements.

What are the consequences of this line of thought for the organisation of the implementation of a global core set of forest-related indicators? The following remarks seem valid:

- The process needs to be managed by a relatively small group of agencies which will play an active role in collecting and verifying information.
- This small group of active agencies must however ensure that there is complete transparency about reporting requirements and data sharing, and, perhaps above all, that the system will provide the outputs needed by all partners, in the format and timetable necessary to produce the necessary outputs, including the SDG reports and the background reports necessary for the review of the IAF
- Assuming agreement within a few months on the core set of indicators, and on the roadmap, a detailed plan should be put in place including timing of enquiries, distribution of responsibilities, handling of information (receiving, checking, dialogue with national correspondents leading to endorsement of the dataset, deadlines for the various outputs, funding, coordination). This should be the responsibility of the small interagency group, which should only include those with an active role in the process.
- For some of the indicators in the list above, research or discussions between experts will be needed to ensure that sufficient data, of adequate quality can be collected. If it appears that this is unrealistic, and results would be partial (or even misleading) the indicator set should be modified. Annex 3 lists those indicators, which, in the consultant's opinion, require urgent work before they can be included in a core set of forest indicators.
- For some indicators, certain agencies would be in a position to provide data from their ongoing work. An example is UNFCCC which has authoritative data on forest carbon stocks and flows derived from national GHG inventories. Wherever possible, partnerships should be developed to address the challenges efficiently while minimising the reporting burden.

It is too early to assign responsibilities, and the process should be inclusive, transparent, and consensus based, but it is clear that some partners are able to make a major contribution. In particular:

- FRA has a long experience of collecting quantitative data on forests through a network of national correspondents, often linked to national forest inventories, and a very transparent methodological approach. The resulting data are officially endorsed by the forest authorities of member countries, which is also an advantage. FRA 2020 could be in a position to provide data on many of the indicators in the proposed list
- The UNFF secretariat has experience of collecting information in the context of countries' reporting on implementation of the UNFI. The correspondents for UNFF, who also have official status, would appear to be well placed to report on policies and institutions.
- It is important not only to be efficient about data, but also to reach out to various technical/policy communities e.g. FRA/NFIs for quantitative forest data, ministries/delegations for policies and institutions. It is also essential to work closely with partners on indicators of importance to them, e.g. CBD, UNCCD, UNFCC, UNEP, especially as they often have extremely competent and complementary operations under way of which the forest community may be unaware

- Ideally there would be synergies with regional C&I processes, both in collecting/validating data and in analysis etc., based on the CFRQ approach

Many of the indicators in the proposed global core set are well known: basic concepts are accepted, definitions are agreed and reporting systems are in place. However, the proposed list also includes indicators which are less well developed, or where persistent problems have emerged over the years. The list of topics where further work is necessary would include:

- Forest degradation
- Mountain Green Cover Index
- Forest damage
- Forest dependent people
- Financial resources from all sources for sustainable forest management
- Wood energy
- Forest products derived from illegal logging or trade
- Systems of Payment for Ecosystem Services

Annex 3 presents the main issues linked to these topics. For each of the indicators where more work is required, it would be appropriate to ask a small group of agencies (including research organisations and national agencies with relevant experience, alongside the international agencies with responsibility in the area) to prepare proposals for implementing the indicator – concepts, definitions, data collection methods etc. Given the time constraints, these small groups should be asked to report back before summer 2017.

Conclusion

It is possible, given sufficient priority and political will, to design and implement a global core set of forest-related indicators. Such a core set should reduce the reporting burden, and dramatically simplify the narrative as regards sustainable forest management and linked concepts, both inside the forest sector and in a broader context. Experience with the regional C&I processes has shown the profound influence on concepts of sustainable forest management of a balanced set of criteria and indicators. The global core set, if widely accepted, and well implemented, has the potential to define the forest agenda for a decade or so. However, the obstacles should not be under-estimated. Political will, resources, flexibility and sensitivity to the needs and situations of other organisations, countries, regions and communities will be required to reach this objective. It is hoped that the OLI will provide an impetus to launch this process, and put the work on a sound foundation.

Annex 1: SDG indicators relevant to forests and possible related forest indicators

SDG indicator[8]	Possible forest indicator
2.3.1 Volume of production per labour unit by classes of farming /pastoral /forestry enterprise size.	Volume of wood harvested/value of production of forestry enterprises per 1000 forest workers, in public and private forests
6.6.1 Change in the extent of water-related ecosystems over time	Change over time in the extent of a) forests and/or b) forest with recognised protective functions for water
7.1.2 Percentage of population with primary reliance on clean fuels and technology	Percentage of population with primary reliance on modern efficient wood-based energy systems
7.2.1 Renewable energy share in the total final energy consumption	Share of wood based energy in total final energy consumption
8.3.1 Proportion of informal employment in non-agriculture employment by sex	Change in formal and informal employment in the forest sector OR Forest sector employment (formal and informal) as percentage of total employment OR Ratio of formal and informal employment in the forest sector to forest area
12.5.1 National recycling rate, tonnes of material recycled	National recycling rate for a) paper and b) wood products, tonnes of material recycled/tonnes consumed
13.2.1 Number of countries that have communicated the establishment or operationalisation of an integrated climate change policy/strategy/plan (...)[9]	Number of countries that have included sequestration and storage of carbon by forests and harvested wood products in national climate strategies OR Number of countries which have explicitly considered the forest sector's role in climate change mitigation, and adaptation to climate change, in their national forest policy statement
15.1.1 Forest area as a percentage of total land area	Forest area as a percentage of total land area
15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type	Proportion of forests that are covered by protected areas
15.2.1 Progress towards sustainable forest management	Progress towards sustainable forest management
15.3.1 Proportion of land that is degraded over total land area	Proportion of forest that is degraded.
15.4.1 Coverage by protected areas of important sites for mountain biodiversity 15.4.2 Mountain Green Cover Index	Mountain Green Cover Index (MGCI), possibly with breakdown of "forest" and "non-forest" parts

[8] The definitive list is Annex IV of the Statistical Commission report E/CN.3/2016/2/Rev.1

[9] Full text: Number of countries that have communicated the establishment or operationalisation of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)

15.5.1 Red List Index	IUCN Sampled Red List Index for plants (gymnosperms only)[10]
15.7.1 Proportion of traded wildlife that was poached or illicitly trafficked	Proportion of traded (consumed) forest products deriving from illegal logging or trade
15.b.1 Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems	Trend in official development assistance for sustainable forest management. Trends in financial resources from all sources for the implementation of sustainable forest management
15.c.1 Proportion of traded wildlife that was poached or illicitly trafficked	Proportion of traded (consumed) forest products deriving from illegal logging or trade
17.9.1 Dollar value of financial and technical assistance (including through North-South, South-South and triangular cooperation) committed to developing countries	Dollar value of financial and technical assistance for sustainable forest management committed to developing countries
17.14.1 Number of countries with mechanisms in place to enhance policy coherence of sustainable development	Number of countries whose mechanisms to enhance policy coherence of sustainable development specifically address forest related issues

[10] Plants under pressure – a global assessment. IUCN Sampled Red List Index for Plants. Royal Botanic Gardens, Kew, UK. 2012. Due to the very large number of species, a sampling approach has been taken. For plants, work has focused on five areas, including gymnosperms.

Annex 2: Seven thematic elements and Four Global Objectives on Forests

Seven thematic elements

The seven thematic elements, as adopted in the UN NLBI, are:

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 of forest resources.
7. Legal, policy and institutional framework.

Global Objectives on Forests

Global objective 1: reverse the loss of forest cover worldwide through sustainable forest management, including protection, restoration, afforestation and reforestation, and increase efforts to prevent forest degradation

Global objective 2: enhance forest-based economic, social and environmental benefits, including by improving the livelihoods of forest dependent people

Global objective 3: increase significantly the area of protected forests worldwide and other areas of sustainably managed forests, as well as the proportion of forest products from sustainably managed forests

Global objective 4: reverse the decline in official development assistance for sustainable forest management and mobilize significantly increased, new and additional financial resources from all sources for the implementation of sustainable forest management

Annex 3: Technical challenges arising from the proposed list of indicators.

Many of the indicators in the list have a long history of data collection and analysis, even if measurement problems still exist. The best example of this is the first, trends in forest area. However for some of the indicators proposed, there has been little or no experience at the international level, or that experience has revealed intractable problems which still need work. This annex briefly presents the indicators which, if they are considered conceptually useful would need research and/or consensus forming discussion before they can be implemented at a global level.

Forest degradation The concept of forest degradation can include many processes which leave the forest in a worse state than before, but still with forest cover (if forest cover is completely lost, then it is deforestation, not degradation). Causes may be over-use for timber or energy, but also pollution, erosion, mining, radiation, climate change or war (presence of landmines). FRA 2015 measured partial canopy cover loss as a proxy for forest degradation, while acknowledging that the concept was not completely satisfactory. "Forest degradation" is referred to in the first Global Objective, so a concept which is clear and measurable should be developed.

Mountain Green Cover Index This index, which measures the share of mountainous regions which are still able to carry out their protective function, based on remote sensing techniques, is being developed by FAO, and is one of the few plausible approaches to measuring forests' protective functions and how effectively they are delivered (area of forest "designated" as having protective functions raises problems of measurement, as well as of separating the multiple functions of mountain forests). The Index has not yet however been implemented at a large scale, and is not well known in the forest sector.

Forest damage. This covers damage of many different types (fire, insects, abiotic causes, anthropogenic) which are measured in different ways, and often overlap with each other. Furthermore, some degree of "damage" is inevitable and normal, so dilemmas arise as to how forest damage should be measured – especially in natural forests.

Forest dependent people The second Global Objective refers to "livelihoods of forest dependent people" and it is clear that many millions of people, mostly very poor, are concerned. However the term of "forest dependent people" is not defined in FRA 2015 and it is uncertain whether the dependency refers to economic factors, residence, share of income or ecological dependency. Given the widespread poverty in these communities, and the importance of subsistence farming, it is also unlikely that comprehensive statistical coverage will be possible. A recent article[11] considers that "there are substantial divergences in who the term refers to, what each of its constituent words mean, and how many forest-dependent people there are globally" and proposes an 18 dimension taxonomy for analysis. The authors point out that "it is not intuitively obvious that either increasing or decreasing forest dependence in any of these dimensions is a policy objective that necessarily benefits the people in question or that is always desirable" Before correspondents are asked to provide information, clear guidance on these matters should be prepared.

Financial resources for sustainable forest management Official development assistance (ODA) for sustainable forest management is relatively well understood and has been the subject of reports to UNFF. However the concept of "financial resources from all sources for the implementation of sustainable forest management", as in Global Objective 4, is wider and could include resources supplied by national governments, by forest owners or financial investors, as well as ODA. Questions arise about whether normal investment in commercial forestry is intended by the text of the Global Objective. These questions should be

[11] Who are forest-dependent people? A taxonomy to aid livelihood and land use decision-making in forested regions Peter Newton, Daniel C. Miller, Mugabi Augustine Ateenyi Byenkya, Arun Agrawal. Land Use Policy 57 (2016) 388–395 http://dx.doi.org/10.1016/j.landusepol.2016.05.032

clarified before correspondents are requested to provide data, if the replies received are to be comparable and meaningful.

Wood energy Energy from wood includes two quite different phenomena: traditional use of fuelwood, often in an energy-inefficient and polluting way, and clean combustion of wood-based fuels as part of an expanding renewable energy sector. The two have quite different policy significance, although they are both "wood energy". Data collection and analysis should probably attempt to separate the two even at the data collection phase, although definition might prove challenging, especially in countries where both types of wood energy coexist.

Forest products derived from illegal logging or trade It is clearly of importance to monitor whether trade in the products derived from illegal logging is increasing or declining, although this presents obvious issues for data availability. However SDG 15.7.1 refers to "Proportion of traded wildlife that was poached or illicitly trafficked", which implies that the SDG indicators expect to be able to monitor illegal trade for wildlife. CITES has in place a significant monitoring operation, and some NGOs also track trade in illegally logged wood alongside poached wildlife. The question of whether meaningful data may be available should be explored. If it is unlikely that objective and reliable data can be produced for most countries, the indicator should be dropped.

Systems of Payment for Ecosystem Services (PES) Payments for ecosystem services (as opposed to theoretical valuation of these services), are becoming more widespread and are seen as a key element of the green economy, with relevance in both developed and developing countries. So far (to the consultant's knowledge) there has been no systematic collection of information on the number or value of forest-related payment systems in place, although some surveys have been carried out[12]. Thus, if it were decided to include this indicator in the core set, it would be necessary to develop not only definitions and classifications, but also reporting mechanisms – unless another agency is already active in this field, with which a partnership could be founded.

[12] For instance by ECE/FAO/UNEP for the study The Value of Forests: Payment for ecosystem services in a green economy, ECE/TIM/SP/34 UN Geneva 2014. Annex 2 of the study lists 84 schemes in place in the ECE region.

Annex 4: Proposal for SDG indicator 15.2.1 submitted to IAEG on 14 November 2016

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.

Indicator 15.2.1: Progress towards sustainable forest management

Definition	"Sustainable forest management" (SFM) 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) The methodology uses a combination of five sub-indicators to measure progress towards all dimensions of sustainable forest management. The environmental values of forests are covered by three sub-indicators focused on the extension of forest area, biomass within the forest area and protection and maintenance of biological diversity, and of natural and associated cultural resources. Social and economic values of forests are reconciled with environmental values through sustainable management plans. The sub-indicator provides further qualification to management of forest areas, by assessing areas which are independently verified for compliance with a set of national or international standards. A dashboard is used to measure progress in the different aspects of sustainable forest management. The adoption of the dashboard approach provide for clear view of areas where progress towards sustainable development goals has been achieved. All sub-indicators are currently reported by countries through FAO's Global Forest Resources Assessment (FRA). These are: • Forest area net change rate • Above-ground biomass stock in forest • Proportion of forest area located within legally established protected areas • Proportion of forest area under a long term forest management plan • Forest area under an independently verified forest management certification scheme For each of these components, countries can set national targets, and monitor and report on progress. The dashboard approach allow countries to assess their current status on sustainable forest management and visualize where further efforts are needed, providing an easy reference for target setting. Targets on the sub-indicators can also be set at regional or global levels.
Rationale and interpretation	The definition of SFM by the UN General Assembly 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 forest area, while essential, and used for target 15.1, is insufficient to monitor sustainable forest management as a whole. The significance of the five sub-indicators can be briefly explained as follows: 1. Trends in forest area are crucial for monitoring SFM. The first sub-indicator focuses on both the direction of change (whether there is a loss or gain in forest area) and how the change rate is changing over time; the latter is important in order to capture progress among countries that are losing forest area, but have managed to reduce the rate of annual forest area loss. 2. Changes in the above-ground biomass stock in forest indicate the balance between gains in biomass stock due to forest growth and losses due to wood removals, natural losses, fire, wind, pests and diseases. At country level and over a longer period, sustainable forest management would imply a stable or increasing biomass stock per hectare, while a long-term reduction of biomass stock per hectare would imply either unsustainable management of the forests and degradation or unexpected major losses due to fire, wind, pests or diseases.

	3. The change in forest area within legally protected areas is a proxy for trends in forest biodiversity conservation and a clear indication of the political will to protect and conserve forest biodiversity. This indicator is related to the CBD Aichi Target 11 which calls for each country to conserve at least 17 per cent of terrestrial and inland water areas. 4. The fourth sub-indicator looks at the forest area that is under a long term forest management plan. The existence of a documented forest management plan is the basis for long term and sustainable management of the forest resources for a variety of management objectives such as for wood and non-wood forest products, protection of soil and water, biodiversity conservation, social and cultural use, and a combination of two or several of these. An increasing area under forest management plan is therefore an indicator of progress towards sustainable forest management. 5. The fifth sub-indicator is the forest area that is certified by an independently verified forest management certification scheme. Such certification schemes apply standards that generally are higher than those established by the countries' own normative frameworks, and compliance is verified by an independent and accredited certifier. An increase in certified forest area therefore provides an additional indication of progress towards sustainable forest management. It should however be noted that there are 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.
Sources and data collection	Countries, through official government-nominated national correspondents, provide data for the sub-indicators to FAO through the Global Forest Resources Assessment (FRA) which is a well-established data collection mechanism that has periodically reported on the world's forest resources since 1948, and the most recent report was published in 2015. Data on the sub-indicators are available from most countries and territories, accompanied by extensive metadata on sources, definitions, conversion from national data to international standards and data quality. All FRA data are submitted and officially endorsed by national authorities. 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 established FRA terms and definitions, which are well known and accepted by forest specialists. See Forest Resources Assessment Working Paper – 180, available at http://www.fao.org/docrep/017/ap862e/ap862e00.pdf . The FRA process is supported by an Advisory Group that meet annually and expert consultations with international experts and country representatives that are carried out every five years. Data collection to the FRA is currently done every five years, with the possibility to impute values for individual years based on the time series. It is being considered to request countries to report annually on these sub-indicators, subject to a consultation with countries planned for 2017.
Comments and limitations	The five sub-indicators all address major elements of SFM, but, for conceptual and data reasons, some aspects of SFM are not included. The State of the World's Forests 2014 acknowledge the limitation of available data on social and economic elements. Even data on forest products are only available for wood products while the non-wood forest products are still largely underreported. The same is valid for elements such as forest health and vitality and protective functions 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 for this SDG indicator build a solid foundation and constitute a core for the further development of more specific "thematic" indicators.
Data for global and regional monitoring	Data is provided directly by member countries or, in the case of forest certification, directly from the certifying bodies. FAO aggregates the data to the regional and global level, and translates the regional and global values and trends into a dashboard with traffic lights.
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 region.
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/

Methodology of the dashboard approach

Sub-indicator 1 - Forest area annual net change rate

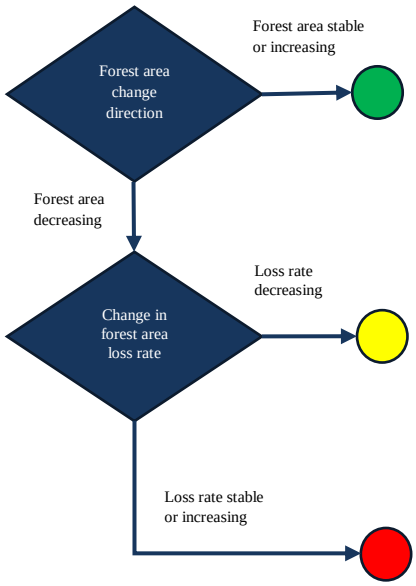
Unit: Percent

Reference period: Most recent period

Method of estimation: Compound interest formula

Translation to dashboard/traffic light:

The following flowchart explains the logic behind the translation of this indicator to a dashboard/traffic light:



The forest area change direction is determined by examining the value of the forest area change rate for the most recent period, a negative value indicate a loss of forest area, a zero value means that forest area is stable and a positive value means that forest area has increased. The change in forest area loss rate is based on a comparison of the current forest area net change rate with the baseline forest area net change rate for the period 2010-2015.

Comments:

This traffic light takes into consideration both the direction of forest area change (if forest area increases or decreases) as well as changes in the rate of forest area loss – the latter important in order to indicate progress among countries that are losing forest area but manage to reduce the loss rate.

For annual reporting, FAO can provide countries with imputed values based on previous trends that they can use in case they don't have new/updated information. The baseline should be updated every 5 years, so in 2020 a new baseline is calculated. Also, at country level, if a country gets new information and updates the historical time series, the baseline for the country will be recalculated, respecting the 2010-2015 period.

Sub-indicator 2 – Above-ground biomass stock in forest

Unit: tonnes/hectare

Reference year: Latest reporting year

Method of estimation: Biomass stock in forest (tonnes) / forest area (ha)

Translation to dashboard/traffic light:

The indicator value for the latest reporting year is compared with the indicator value for previous reporting year for assessment of continuity of progress since last report.

The ratio (r) between the current indicator value and the previously reported value is calculated; r>1 means an increase in stock per hectare, r<1 means a decrease while 1 indicates no change. A narrow interval for r has been established to indicate a stable condition, and traffic-light colors are assigned as follows:

$r \geq 1.01$ 

$0.99 < r < 1.01$ 

$r \leq 0.99$ 

Sub-indicator 3 – Proportion of forest area located within legally established protected areas.

Unit: Percent

Reference year: Latest reporting year

Method of estimation: Forest area within legally established protected areas / forest area 2015 * 100

Translation to dashboard/traffic light:

The indicator value for latest reporting year is compared the indicator value for previous reporting year for assessment of continuity of progress since last report.

The ratio (r) between the current indicator value and the previously reported value is calculated; r>1 means an increase in forest area within protected areas, r<1 means a decrease while 1 indicates no change. A narrow interval for r has been established to indicate a stable condition, and traffic-light colors are assigned as follows:

$r \geq 1.01$ 

$0.99 < r < 1.01$ 

$r \leq 0.99$ 

Comment:

Using forest area in 2015 as denominator for estimating this indicator ensures that the time series of percentages reflect real changes in the forest area within legally established protected areas and is not affected by changes (losses or gains) in total forest area.

Sub-indicator 4 – Proportion of forest area under a long-term forest management plan.

Unit: Percent

Reference year: Latest reporting year

Method of estimation: Forest area under a long term forest management plan / forest area 2015 * 100

Translation to dashboard/traffic light: The indicator value for latest reporting year is compared with the indicator value for previous reporting year for assessment of continuity of progress since last report.

The ratio (r) between the current indicator value and the previously reported value is calculated; r>1 means an increase in areas under forest management plan, r<1 means a decrease while 1 indicates no change. A narrow interval for r has been established to indicate a stable condition, and traffic-light colors are assigned as follows:

$r \geq 1.01$ 

$0.99 < r < 1.01$ 

$r \leq 0.99$ 

Comment:

Using forest area in 2015 as denominator for estimating this indicator ensures that the time series of percentages reflect real changes in the forest area under forest management plan and is not affected by changes (losses or gains) in total forest area.

Sub-indicator 5 – Forest area under an independently verified forest management certification scheme.

Unit: Hectares

Reference year: Latest reporting year (as of June 30)

Method of estimation: Data will be collected directly from the databases of each certification scheme.

Translation to dashboard/traffic light: The indicator value for latest reporting year is compared with the indicator value for previous reporting year for assessment of continuity of progress since last report.

The ratio (r) between the current indicator value and the previously reported value is calculated; r>1 means an increase in areas under an independent forest management certification scheme, r<1 means a decrease while 1 indicates no change. A small interval for r has been established to indicate a stable condition, and traffic-light colors are assigned as follows:

$r \geq 1.01$ 

$0.99 < r < 1.01$ 

$r \leq 0.99$ 

Comments:

Using June 30 as the date for reporting, allows for the certification bodies to have their databases updated so they can provide information to FAO by end of the year, and then be included in the annual reporting to SDG in the beginning of the following year.