

## Assessing the sustainability of forest management in Europe

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### 1 Introduction

Policy makers, inside and outside the forest sector, and the general public, need to know whether forest management in Europe is sustainable, and, if not, which aspects are unsustainable and should therefore be corrected. Forest sustainability reports, produced so far, have presented the best available information on sustainable forest management in Europe, but have not attempted to answer this core question, as a number of serious conceptual and methodological difficulties make an objective assessment of sustainability rather complex and difficult.

This paper proposes a concept that might supply a preliminary answer to the question of the sustainability of Europe's forest management, which was applied in the State of Europe's Forests (SoEF) 2011. It must be made clear from the start that the methods used are still experimental, and need to be refined and improved in the light of experience with SoEF 2011. They have been developed by the secretariats and the Advisory Group, which are responsible for the content of the study, but have not been officially endorsed by governments. National correspondents have been informed of the process. It is intended that this approach will be the subject of a widespread consultation among academic, policy and stakeholder circles, enabling an improved assessment for the next edition of State of Europe's Forests.

To develop the approach for assessing sustainability of forest management, the authors started from the widely accepted definition agreed in Forest Europe Helsinki resolution H1<sup>1</sup>. Several basic principles are proposed for the assessment. The authors have attempted to prepare an assessment which would:

- Be based on the Forest Europe criteria and indicators for sustainable forest management, as endorsed by the Vienna Ministerial Conference.
- Assess the sustainability of forest management according to a common methodology, while taking full account of different national situations, notably size, ecology, demography, economy and history.
- Be comprehensive and balanced, covering all criteria, quantitative and qualitative, indeed, to the extent possible, all indicators and give equal weight to each criterion. All Forest Europe countries should be covered, even those with very poor data.
- Take full account of trends and the temporal dimension, as the definition refers to "now and in the future." In this context, a description of the situation in 2011 is not, by itself, sufficient.
- Be based exclusively on the data supplied by governments, on quantitative and qualitative indicators, which have been carefully validated

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<sup>1</sup> "Stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems"

- Use a rigorous and transparent methodology, with a minimum input of subjective assessment
- Present its results in a clear, but non-judgemental, way, giving policy makers and the general public a clear overview of a complex situation. This should facilitate efforts to improve the communication of the sector as whole, to the general public and to other relevant sectors.
- Be accompanied by explanatory text which puts the data and assessments in context.

## 2 Concepts and methodology

The approach contains the following steps:

- For each quantitative indicator, one “key parameter” was chosen which focuses on the main purpose of the indicator, but is “size-independent”, typically a ratio or a percentage change over time, so that countries or country groups can be compared without excessive distortion. The key parameters for the quantitative indicators are listed in Table 1: Key parameters used for the assessment of sustainable forest management in Europe: quantitative indicators, and the rationale for their choice is available in a separate document.
- Countries’ performance for each key parameter was assessed on a scale from one “tree” (♣) to five “trees” (♣♣♣♣♣). The thresholds for the assessment by “trees” are explained in the separate document. Given the sensitivity of making this assessment, especially of fixing the thresholds, these assessments by country are not being published, although the data on each key parameter<sup>2</sup>, which are derived from official data, are presented in the annex tables.
- An assessment was prepared for each indicator, by country group, based on an average of the countries’ assessments, weighted by land area, and counting “No data” (ND) as one “tree”<sup>3</sup>. These were then combined to produce an overview table, by criterion and country group, which is the basis for the commentary in this part of SoEF 2011.
- A similar process was followed for the qualitative indicators. It is not the role of the authors to judge the appropriateness of particular policies, laws or institutions: the focus was on establishing, from country responses on qualitative indicators, whether objectives had been identified, whether policies, institutions, and policy instruments are in place to address the issues identified as being of importance. It should be pointed out that it has not been possible to validate the answers on qualitative indicators in the same objective way as for the quantitative indicators.
- As for the quantitative indicators, countries were assessed on a five-“tree” scale for the qualitative indicators and the results aggregated to the country group level.

This approach is a new one, and although based exclusively on official data, must be considered exploratory and experimental. It is strongly recommended that this method and these first results should be discussed and reviewed after the issue of the report to enable an improvement and extend its application in the future.

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<sup>2</sup> Including information on lack of data.

<sup>3</sup> The authors believe that it is not possible to manage forests sustainably without adequate information on the outcomes, so lack of information on an indicator means that the indicator is not being addressed properly. Furthermore, there are no objective reasons to assign any specific assessment if no data are available. If “No data” had been given an “average” assessment, say three “trees”, a misleading picture of the situation would have been created.

Two warning remarks are necessary:

- In many cases, low assessments (two “trees” at the country group level) result from the failure of several large<sup>4</sup> countries to provide information on that particular indicator, as “No Data” has been considered equivalent to one “tree” - the lowest ranking. In the authors’ view this is necessary as there is no evidence to attribute any other ranking. Furthermore, truly sustainable forest management is not possible if there are no data to monitor performance.
- For several indicators, despite the best efforts of correspondents and reviewers, it is clear that the data received are not fully comparable between countries, although all claim to be submitted according to the internationally agreed definitions<sup>5</sup>. Rather than abandon the effort to assess these dimensions of sustainable forest management, which would have seriously distorted the overall result by omitting relevant aspects, the authors have preferred to include these data in the tables, and take account of the lack of comparability in the comments.

The process outlined above provides the core of the analysis in this part of the study. However there are some major, cross sectoral challenges and opportunities for sustainable forest management in Europe, which cut across the structure of the indicators and which should be addressed in the light of the outlook for the sector as whole developed in other studies, notably the forthcoming European Forest Sector Outlook Study (EFSOS).

### 3 Follow up to SFM assessment in SoEF 2011

Development of various types of assessments, based on quantitative criteria, e.g. FAO “traffic lights”, WWF “score cards”, EEA “faces” or sustainability indexes for banking sector, indicates the growing need for consistent messages on SFM results. Although the nature of the sustainable forest management is complex, the lack of this type of tools is difficult to explain, as similar indexes has been developed for other, equally complex, sectors (e.g. Human Development Index). Regardless of the final result of the process is, it is worthwhile to initiate discussion on setting up a process (task force) that would focus on analysing of the proposed concept and address the following issues:

- Broad concept and theoretical backing of the concept.
- Choice of key parameters for individual indicators.
- Setting thresholds for quantitative indicators:
  - criteria for thresholds ; should thresholds based on frequency distribution be recalculated each time or should the fixed set be maintained so that progress can be shown?
  - should available official international targets be used to set threshold values,?

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<sup>4</sup> Lack of data for small countries, with negligible forest areas, have little influence on the assessment as all the results are weighted by land area to obtain country group data.

<sup>5</sup> Indicators for which the key parameters present is a serious problem of lack of comparability of data supplied include 3.3 (marketed non-wood goods), 3.4 (marketed services), 4.5 (deadwood), 6.4 (expenditure for services), 6.6 (occupational safety and health) and 6.10 (accessibility for recreation).

- Qualitative indicators: discuss how to measure objectively the effectiveness of policies and institutions? Should they be:
  - mixed with quantitative ones (i.e. quantitative data measures effectiveness of policies, conformity to certain guidelines etc.)?
  - assessed with the use of simplified criterion – existence of information?
- Lack of data – how to classify non-responses?

The starting point for the possible/proposed process would be principles and results of assessment done for the SoEF2011 report. Sharing of experience with other regions (Montréal Process), the global level (FRA, but also IUFRO, CPF ...) and other sectors would be beneficial for the process. In addition the process would include consultations with countries, possibly through network of national correspondents and Team of Specialists on Monitoring SFM. The results of the process will be presented to parent bodies their consideration and decisions regarding the future steps.

Table 1: Key parameters used for the assessment of sustainable forest management in Europe: quantitative indicators.

Ind.	Key parameter for assessment	Unit	Comment
1.1	Annual change in forest cover 1990-2010	percentage points	Measure of change preferred to present status in order to avoid comparing very different histories and situations. Implicitly assumes that increase in forest area is positive.
1.2	Annual change in growing stock/ha, 1990-2010	m3	Growing stock per hectare may increase if cuttings are consistently below net increment. They may decrease if there is overcutting, but also (as is the case in several countries) when there is strong expansion onto non-forest land, which, when planted, has very low growing stock per hectare
1.3	Percent of even aged forest in 0-40 age class <sup>6</sup>	%	An unbalanced age class structure (e.g. because of past overcutting or irregular planting activity) can perturb future wood supply. In practice, the age class structure reflects past silvicultural decisions and is a weak indicator of sustainability
1.4	Annual change in total living carbon stock on FOWL, 1990-2010 <sup>7</sup>	%	Build up of carbon in the forest ecosystem is a proof of success in carbon sequestration (and as regards carbon in living trees will be determined by trends for growing stock). Carbon in soil, deadwood and litter ignored as practically no change data available.
2.1			
2.2			
2.3			
2.4			
3.1	Ratio fellings/NAI, 2005	%	Felling more than increment over a long period is clearly unsustainable although it may be necessary on a temporary basis either because of damage or to rejuvenate the resource. Everything under 95% <sup>8</sup> is considered acceptable, as it is not appropriate to prefer one rate of resource use to another
3.2	Ratio value of marketed roundwood/growing stock, 2005	€/1000 m3	Measures the intensity of use of the wood resource, as well as the ability to market roundwood successfully
3.3	Value per hectare of marketed non-wood goods	€/ha of FOWL	Measures the intensity of use of the forest to supply non-wood goods. The data supplied are clearly not fully comparable between countries, but are the best available.
3.4	Value of marketed services per hectare	€/ha of FOWL	Measures the intensity of use of the forest to supply services. The data supplied are clearly not fully comparable between countries, but are the best available.

<sup>6</sup> For the assessment the overall balance between age classes, and any major gaps were examined.

<sup>7</sup> If no data on soil carbon, then only 3 « trees », even if fast rise in carbon stock in biomass.

<sup>8</sup> 95% is chosen to take account of harvesting losses etc. and as a measure of prudence

3.5	Percentage of FOWL under management plan or equivalent	%	Long term objective and explicit planning is clearly a part of sustainable forest management. However, the data are not fully comparable without reference to the footnotes as countries vary in the way they have interpreted the instructions n treatment of informal plans for small forest owners.
4.1	Share of single species stands, 2005	%	A proxy for biodiversity. In many parts of Europe, single species stands are less natural and have poorer biodiversity. However, this is not the case in some areas, notably the boreal regions where natural forests are often monospecific
4.2	Share of natural regeneration in total regeneration	%	Measures the extent to which naturally occurring genetic diversity is preserved over rotations. Higher rates of natural regeneration are considered more favourable to genetic diversity
4.3	Share of plantations in FOWL	%	Approximates “naturalness” (there are too few “undisturbed” areas in Europe to construct a credible indicator). A higher share of plantations indicates a “less natural” forest resource overall.
4.4	Share of introduced species in FOWL	%	An indicator of change in species diversity and a frequent biodiversity indicator. The higher the % of introduced species, the greater disturbance to native biodiversity (even if the introduced species make a significant contribution to wood production)
4.5	Volume of deadwood on FOWL	m3/ha	An indicator of conditions and silvicultural practice favouring biodiversity. Insufficient knowledge is available to estimate what are “desirable” deadwood levels in different circumstances, or to measure change, so it has been assumed that more deadwood is correlated with higher biodiversity.
4.6	Country average of normalised connectivity per landscape unit	Scale 0 (no connectivity) to 1 (complete connectivity)	See report on indicator 4.6. Note: connectivity varies widely between regions inside a country.
4.7	Share of forest land managed for conservation of genetic resources	%	Includes area managed for in situ gene conservation, ex situ gene conservation and for seed production, as a share of total forest. Does not address the question of whether this is enough or whether specific series genetic diversity is adequately protected, but seems an adequate proxy
4.8	Availability of data on threatened forest species	scale 1-4	Data are available for many countries on threatened species, but often not on total forest related species. Furthermore it is hard to interpret the raw data as a high number of species might mean a danger to biodiversity, but could also reflect diligent data gathering or a country with many species at the edge of their ranges. For that reason the parameter chosen for SOEF 2011 addresses only the availability of information.
4.9	Area protected as % of FOWL	%	The definitions of “protected” forest have been much discussed and harmonised by MCPFE. The

			threshold chosen for *** is the agreed CBD target of 17% protected area.
5.1	Protective function index: soil and water	scale 1-4	There is ambiguity in the responses about whether the data supplied refer to forests which have a protective function, sometimes measured by national forest inventory, or those which have a designated status (as intended by the enquiry). Many countries could not supply any information. Therefore an index was created (no data on area with protective functions (**), data on area (***), data on area designated (****)).
5.2	Protective function index: infrastructure etc.	scale 1-4	See 5.1. Often countries were unable to separate protective functions (soil and water) from protective functions (infrastructure). In this case, 5.2 was scored at **.
6.1	Number of private forest holdings as share of rural population	%	The official rationale for indicator 6.1 refers to the important contribution of private forest holders to the rural economy. As no data were requested on the number of forest owners, the number of private forest holdings was taken as a proxy <sup>9</sup> for the number of forest owners and compared to the total rural population
6.2	Share of GDP taken by forest sector, 2010	%	Measures the relative importance of the forest sector in the national economy. Includes the forest industries (sawmills, panel, pulp and paper plants)
6.3	Net entrepreneurial revenue per hectare, average of years reported	€/ha	Measures the contribution of forest ownership to revenue of forest owners.
6.4	Government expenditure for forest services per ha of forest, average of years supplied	€/ha	Indicator intended to measure income from non-marketed services, but in practice few if any respondents were able to supply this. However information was provided on government subsidy schemes and incentive programmes, even if not directly connected to specific services, which provides useful indications of the extent to which government contributes to the forest sector. However the approach varies, even between the countries which reported.
6.5	Forest sector labour force as % of population	%	Measures the relative importance of the forest sector as a provider of jobs. This share has been falling steadily in almost all countries.
6.6	Non-fatal accidents per 1000 workers, 2010	No./1000 workers	Measures the safety and health of the forest workforce. Non-fatal accidents were used as they are more numerous than fatal accidents and thereby less subject to arbitrary variation. This rate is influenced not only by good working practices (or lack of them) but also by natural conditions (slopes,

<sup>9</sup> Because of owners with multiple holdings and holdings with multiple owners e.g. through succession, the correlation is not direct.

			windblow) which are out of the control of forest managers.
6.7	Consumption of wood products per head, 2007-2009,	m3 roundwood equivalent	As wood is a renewable raw material, and “sound use of wood” is an objective of many policies, this parameter measures indirectly, sustainable consumption patterns, to the extent that forest products are consumed instead of non-renewable, less sustainable materials
6.8	Net imports as % of apparent consumption, 2007-9	%	Measures the degree to which countries are dependent on external sources of forest products, or, conversely, contribute to the sustainable consumption of others.
6.9	Share of energy from wood in national energy production	%	Measures the extent to which wood contributes to national energy supply. Includes all types of wood energy, not only “fuelwood” from forests.
6.10	Annual visits per hectare of FOWL	Visits/ha	Should measure the intensity of recreation use, as in all countries, nearly all forests are “accessible for recreation”. Unfortunately, relatively few countries have data on number of visits or areas where recreation is a major management objective.
6.11	Index of data availability on number of cultural and spiritual sites	scale 3-4	There is no possible comparability between the number of cultural and spiritual sites (archaeological remains, exceptional trees, historic sites etc.), so the availability of data on the different categories is used as a proxy.