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## **ANNEX 4: OVERVIEW BY INDICATOR OF CHALLENGES FOR MONITORING PURPOSES**

This table reviews each quantitative pan-European indicator, from the point-of-view of monitoring sustainable forest management. It aims to indicate whether or not the quality and availability of the data are adequate to enable useful monitoring in the area covered by that indicator. Data availability and quality are only two of the aspects to be taken into account when reviewing indicators. This table does not take into account the indicators' relevance, usefulness to policy or scientific validity, especially as the objectives of the indicator set have not yet been clearly identified. Choice of indicators will be based on a combination of these factors, as part of a transparent and comprehensive process. The table is based on responses to the project's enquiry to national correspondents, and the experience of SoEF 2011. The opinion in the right hand column represents only the best judgement of the project team and has not been reviewed or approved by any other body or group. It is intended as input to a future process of review of the indicator set, as recommended by the project.

To be noted:

- The table addresses only the existing indicator set. Any proposed new indicators would also need to be reviewed from the point-of-view of data quality and availability.
- some of the “non-responding” countries for each indicator in relation to the SoEF 2011 are often the very small or forest-poor countries (Andorra, Holy See, Malta, Monaco, etc.) which cannot reasonably be expected to maintain comprehensive data on their forest resource for most indicators (except 1.1). For that reason, data are not expected to be available in 100% of Forest Europe countries.

Indicator	Data quality and availability, according to SoEF 2011	Number of countries lacking reliable data for SoEF 2011 (based on Table 7)	Issues highlighted by the country correspondents in the national enquiries		CI-SFM Team's comments on data quality and availability
			Number of respondents considering the indicator as "challenging" (total respondents: 39)	Respondents' description of the challenges	
1.1 Forest area	Estimates of forest area are available for all countries and all years, with some non-respondents for availability for wood supply (7) and tree species (14). All data have been adjusted to fit international definitions.	0	1	Difference between national and international definitions on forest types: need for recalculation of data in order to fit to the reporting tables.	Data quality and availability adequate for this indicator.
1.2 Growing stock	Data provided by almost all countries for almost all years. Weaknesses in a few countries for other wooded land (13), availability for wood supply (8), species (6).	3	<i>not mentioned by the respondents</i>		Data quality and availability adequate for this indicator.
1.3 Age structure and/or diameter distribution	Data frequently missing, especially for diameter distribution. Reliable information on age only available for certain regions. Definitions vary between countries and some forests are "non-categorized".	17	3	The respondents highlighted that the problems are rooted in the data collection at national level.	Major data availability and quality issues for this indicator.
1.4 Carbon stock	Data available for almost all countries all years, on carbon in biomass, (derived from growing stock data in m <sup>3</sup> , often using standard conversion factors agreed through IPCC). Data missing for 18 countries for soil carbon, which involves special surveys.	4	4	The respondents reported missing methodology in collecting data in their present national forest resource assessments and the need to estimate indicator 1.4 related data were seen as a challenging task as well.	Data quality and availability are adequate for biomass carbon. Need to invest in soil carbon surveys as soil is estimated to be the largest forest carbon stock and carbon stocks in soil are not well known.

2.1 Deposition of air pollutants	Accurate data provided from 300 sample plots. However many countries not, or weakly, covered by the network. Results difficult to express in terms of countries, as sampling intensity not high enough.	8	<i>data provided by ICP Forest/EC JRC</i>		Good basic data, but need to expand coverage and address the sampling question, so that national data can be developed. Another approach (percentage of land area with depositions over critical loads) used in Part III: still 8 countries with no data.
2.2 Soil condition	Data derived from two special surveys, covering 23 EU member states (BioSoil), with sufficient plots to provide national data for the countries covered.	24	<i>data provided by ICP Forest/EC JRC</i>		Data quality and availability adequate for this indicator in the countries covered in 2011. However at present no further BioSoil surveys are planned. Need to expand coverage to other EU and non-EU countries.
2.3 Defoliation	Results based on annual surveys of over 7000 plots in 30 countries. Time trends available. For sampling reasons, results not presented at national level.	11	<i>data provided by ICP Forest/EC JRC</i>		Good basic data, but problems with coverage, and sampling intensity. The frequency of surveys and the number of plots is being reduced for budgetary reasons.
2.4 Forest damage	Many methodological issues arising from the different nature of the types of damage and the ways of surveying them <sup>1</sup> – indeed of what constitutes “damage” in a semi-natural ecosystem. All countries were invited to report their specific damage vectors, notably area damaged by fire. Much detailed information supplied, but many gaps and data difficult to aggregate, synthesize and compare.	16	3	Data for some agents of forest damage is not collected in present forest resource assessment. One respondent suggests including to this indicator also other categories, e.g. forest area damaged by forest fires, being an important cause of forest damage in this country.	Need for strong consensus on definitions of “damage”, monitoring approaches and data needs, before truly objective monitoring is possible.

<sup>1</sup> For example, whether to measure annual or cumulative damage, how to attribute damage with multiple causes (e.g. drought, fire, insects in succession). Typically an area damaged by two separate species of insects is counted twice. It is also difficult to know what level of “damage” e.g. from game or windblow is “normal”.

3.1 Increment and fellings	24 countries provided comparable data on both net annual increment (NAI) and fellings. Data quality/comparability issues include treatment of natural losses and harvest losses. However, in almost all cases, a reliable estimate of the fellings/NAI ratio is possible.	10	1	Reporting mechanisms and co-ordination of data sources for this indicator was problematic in the past. Nevertheless as a consequence a systematic statistically grounded national forest inventory has been developed by this country, which will make it possible to provide improved data in 2013.	Data adequate for a general overview, but work needed to improve detailed comparability of data often derived from different sources (sample based inventories and annual industry surveys).
3.2 Roundwood	38 countries reported data on volume of roundwood removals, although it is clear that only a few countries assess fuelwood removals on a representative scale. 33 countries reported on the value of roundwood removals, although it is not clear whether the data take into account whether the wood was actually marketed or not.	15	2	Respondents mentioned problems in reporting data on removals under bark.	Data quality and coverage adequate for volume, although better coverage of fuelwood desirable. Data quality needs improvement for value of marketed roundwood.
3.3 Non-wood goods	Data provided by 33 countries but data sets “fragmentary” for many reasons: lack of measurement systems, wide variety of non-wood goods, unclear concepts of meaning of “marketed” and how to value the production, etc.	18	8	Respondent countries viewed this indicator as the third most challenging due to missing data collection methods. The required data is estimated for many of these countries.	Data quality and coverage not yet adequate to analyze situation and trends in comparable and objective manner.
3.4 Services	Data on value of marketed services reported by 16 countries, although data limited in most countries. A number of countries reported difficulties quantifying the value of marketed services (exceptions are value of hunting and fishing licences).	32	9	Rated as second most challenging indicator, due to not existing comprehensive and complete statistics according to the proposed classification.	Data quality and coverage not yet adequate to analyze situation and trends in comparable and objective manner.

3.5 Forest under management plan	29 countries reported area of forest under management plan or equivalent, but closer examination of replies reveals that the SoEF guidelines and definitions had been interpreted in very different ways, so that data are not really comparable between countries.	6	3	Countries had difficulties in interpreting this indicator, e.g. when is a management plan outdated.	Data availability is satisfactory, but interpretation of guidelines must be standardized before truly comparable data sets can be established.
4.1 Tree species composition	29 countries reported data.	15	<i>not mentioned by the respondents</i>		Data quality and availability adequate for this indicator, although coverage could be extended.
4.2 Regeneration	Over 30 countries reported the share of forest area by regeneration type.	5	<i>not mentioned by the respondents</i>		Data quality and availability adequate for this indicator, although coverage could be extended.
4.3 Naturalness	Over 30 countries reported on naturalness (“undisturbed by man”, “semi-natural” or “plantations”). However there are serious issues of definition: e.g. stands that were established as plantations but have developed over time are considered as semi-natural in some countries.	4	2	The lack of up-to-date information on this indicator is seen by the respondents as challenging.	Data availability is adequate for this indicator. However, the present classification of this indicator is causing reporting problems for several countries, as well as problems of comparability between countries. Therefore a more clear definition of the classes is required.
4.4 Introduced tree species	11 countries unable to provide data for 2010.	9	1	<i>no explanation given by the respondent</i>	Data quality and availability adequate for this indicator, although coverage could be extended.
4.5 Dead wood	21 countries able to provide recent data (considerably more than for previous SoEF). Data sometimes based on inventory with sample plots, sometimes on local studies. National averages can be misleading.	16	5	Measuring and evaluating data on dead wood is seen by the respondents as challenging.	Data quality and availability now adequate for this indicator, and improving, as this parameter becomes part of regular monitoring efforts.

4.6 Genetic resources	39 countries reported to EUFORGEN, mostly using the EUFGIS portal and database. Information is mostly geo-referenced and analyzed by EUFORGEN.	6	<i>data provided by Bioversity International (EUFORGEN)</i>		Data quality and availability adequate for this indicator: a specialist organization (EUFORGEN) maintains and continuously improves the information set.
4.7 Landscape pattern	A one-off Europe-wide case study by JRC, using land cover maps (Corine) assessed forest connectivity and shares of different types of forest cover. Results adapted to generate data at country level for Part III.	6	<i>data provided by EC JRC</i>		The first case study should be repeated and improved, after in-depth discussion of methods and of the meaning of the results. The results should also be aggregated at the national level to obtain a link with SFM policies and instruments.
4.8 Threatened forest species	27 countries reported on this. Data were better for forest trees than for other forest occurring species. However data are “very heterogeneous”, ranging from full to “fragmentary” and with unexplained differences between countries. Problems arise in differentiating “forest occurring” species from other species.	0	4	Countries stated that information on this indicator is not collected in the proposed format.	Considerable work is needed both on definitions (e.g. “forest occurring”) and on data collection before the data available can be analyzed in a meaningful way. Data which are comparable over time are necessary for analysis of trends.
4.9 Protected forests	30 countries provided information, according to the detailed MCPFE Assessment Guidelines. However, the diversity of national protection regimes reduces inter-country comparability, especially with regard to classes 1.3 and 2 <sup>2</sup> . The data provided by the EU countries on forest area within NATURA 2000 areas were seen as “sparse”.	8	2	Difficulty to interpret the MCPFE classes was mentioned by the respondents. In addition the data delivered on overlapping with NATURA 2000 areas was mentioned as inconsistent.	Data availability is adequate for this indicator, although the results are still difficult to interpret because of the variety of national situations and definition problems. It should be considered to obtain data on NATURA 2000 in the future from EC DG Environment.

<sup>2</sup> 1.3 Conservation through active management. 2 Landscape

5.1 Protective forest – soil, water and other ecosystem function	37 countries provided information. However explanatory information provided by countries shows that “the assessment guidelines may not have been interpreted consistently”. Areas reported included areas with identified protection functions, areas with given physical characteristics (e.g. slope) as well as areas with different types of “designation”: management plans, legal instruments etc. (see also 5.2).	13	3	Countries mentioned this indicator as challenging because of no data availability on classification of forests according to specific protective functions.	Areas “designated” for protection were reported by only a few countries, so the published information aggregated “designated” areas (as laid down in the indicator), with areas having a protective function. At present, most of the data supplied, although useful and relevant, do not directly address the issue defined by the indicator.
5.2 Protective forest – infrastructure and managed natural resources	Many countries were unable to separate the objectives of the protective function (soil/water v. infrastructure/natural resources), as both functions are often provided simultaneously. Several countries combined data for 5.2 with those for 5.1.	27	4	Countries mentioned this indicator as challenging because of no data availability on classification of forests according to specific protective functions.	See comment on 5.1, as well as the inevitable aggregation of data for 5. 1 and 5.2.
6.1 Forest holdings	Data on public/private ownership breakdown easily available. Data on number of private holdings were “partly or completely unavailable for many countries”.	0	4	The lack of information due to protection of personal data is seen as challenging by the countries.	Data availability adequate for monitoring of broad trends in ownership, but not for more detailed analysis of number and size of holdings.
6.2 Contribution of the forest sector to GDP	Data available from national accounts.	12	<i>not mentioned by the respondents</i>		Data quality and availability adequate for this indicator.
6.3 Net revenue	Analysis was based on statistics from Eurostat economic accounts and a few national reports. Data only available for most EU countries (not all), Russia and Switzerland.	23	4	According to the countries, the required data is not available.	Data quality and availability for this indicator improving in the countries covered: elsewhere (23 countries), data are inadequate.

6.4 Expenditure for services	Countries able to provide less than a quarter of requested data (see SoEF 2011 table 43). Main issues: data for 1990, partial coverage of services listed, non-response (15 countries). “Large amount of partial data” made aggregation and synthesis very difficult.	27	15	This indicator is reported as the most challenging under the CI-SFM project. Problems were seen here mostly in non-existing comprehensive statistic or existing but fragmented data.	Data quality and availability not adequate for this indicator. Need for systematic surveys to obtain basic data.
6.5 Forest sector workforce	Data taken from labour force surveys. May be some problems with classification of certain forest related occupations (teaching, environmental management, etc.) which are included in other parts of labour force classification.	9	3	Data for this indicator is not collected or data is obtained from different sources.	Data quality and availability adequate for this indicator.
6.6 Occupational safety and health	Data supplied by 28 countries. However “statistical basis is very different among countries”, for instance as regards inclusion/exclusion of self employed contractors and private forest owners, as well as definition of “occupational accident <sup>3</sup> ”.	20	1	Required data is not available in this country.	Data quality and availability not adequate for this indicator. Work needed on concepts and definitions, as well as to collect basic information.
6.7 Wood consumption	Data on consumption (production + imports – exports) and trade supplied annually for all products through JFSQ, and checked by a team of international agencies.	3	<i>data provided by UNECE-JFSQ</i>		Data quality and availability adequate for this indicator.
6.8 Trade in wood	See 6.7.	4	<i>data provided by UNECE-JFSQ</i>		Data quality and availability adequate for this indicator.
6.9 Energy from wood sources	33 countries reported, twice as many as for SoEF 2007, thanks to Joint Wood Energy Enquiry (JWEE) which is carried out by UNECE/FAO every two years. Gaps and uncertainties persist because of inherent problems measuring flows of wood energy.	13	4	Countries report on challenges in providing data on national level due to missing methodology.	Data quality and availability are now nearly adequate for this indicator, although they should be improved, as regards coverage and accuracy.

<sup>3</sup> For instance, how many days off work are necessary for an accident to be included in the statistics? Which diseases are considered as linked to the occupation?

6.10 Accessibility for recreation	34 countries responded on accessibility, but only 17 provided quantitative estimates of intensity of use.	26	1	Country reports on challenges in providing data on national level due to missing methodology.	Data quality and availability adequate for this indicator as regards accessibility, but not for intensity of use, where basic fact finding surveys are missing in many countries.
6.11 Cultural and spiritual value	29 countries provided information on number of forest sites with cultural and spiritual values. However, there was a wide disparity of approach to the many types of site which might be included (cultural heritage, including archaeological sites, forested landscapes, special trees, other sites). "Data are incomplete ... and should be treated with caution", because of inconsistencies, lack of surveys etc.	11	4	Countries report on challenges in providing data on national level due to missing methodology.	Data quality and availability not adequate for this indicator