

# Assessing the Sustainability of Forest Management in Europe

## 1. Introduction

Policy makers, inside and outside the forest sector, and the general public should know whether forest management in Europe is sustainable and, if not, which aspects are unsustainable. Parts I and II of this study have presented the best available information on sustainable forest management (SFM) 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. Furthermore, these parts of the study were organised taking one indicator at a time, while sustainability must take into account the balance among all the indicators in the set.

This chapter proposes a tentative answer to the question of the sustainability of Europe's forest management, but 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 the *State of Europe's Forests 2011*. They have been developed by the secretariats and the Advisory Group, which are responsible for the content of the assessment, but given their experimental nature have not been presented to governments. National correspondents have been informed of the process but have not been asked to endorse the results, as this is still a work in progress. It is hoped that this approach will encourage further methodological development, after consultation of academic, policy and stakeholder circles, enabling an improved assessment for the future. It is the hope of the authors of this chapter that this assessment will stimulate debate around its further refinement as well as the identification of additional ways and means to evaluate SFM and thus contribute to its better implementation.

To develop the approach for assessing sustainability of forest management, the authors started from the widely accepted definition of SFM agreed in Helsinki resolution H1<sup>1</sup>. The assessment is based on a few basic principles.

The authors have attempted to prepare an assessment which would:

- Be based on the pan-European criteria and indicators for sustainable forest management (SFM), as endorsed by the Vienna Ministerial Conference in 2003.
- Assess the sustainability of forest management according to a common, standardized and transparent methodology, while not being distorted by specific national situations, notably size, ecology, demography, economy and history.
- Be comprehensive and balanced, covering all criteria, and all indicators, quantitative and qualitative, and give equal weight to each criterion. All Forest Europe countries were covered, even those with very poor data.
- Take account of trends and the temporal dimension, as the definition of SFM refers to "now and in the future." In this context, a description of the situation in 2011 is not, by itself, sufficient.
- Be based essentially on the data supplied by governments, presented in Parts I and II of the study, which have been carefully validated.
- Use a rigorous and transparent methodology, with a minimum input of subjective assessment, beyond the initial setting of threshold levels for different categories.
- Present its results in a clear way, giving policy makers and the general public a clear overview of a complex situation. This should facilitate balanced, strategic and operational forest-related decision-making by different stakeholders. It should also help to improve communication inside the forest sector, with the general public and with other relevant sectors.
- Be accompanied by explanatory text which puts the data and assessments in context.

<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" (Helsinki Resolution 1, 1993).

## 2. Concepts and methodology

The approach contains the following elements:

- For each quantitative indicator, one “key parameter” was chosen which focuses on the main purpose of the indicator but is independent of the size of the country, typically a ratio, a percentage change over time, or an index of data availability, so that countries or country groups can be compared without excessive distortion. The key parameters for the quantitative indicators are listed in Table 85, with a short rationale for the choice of each key parameter.
- Countries’ performance for each key parameter was assessed on a scale from one “tree” (🌳) to five “trees” (🌳🌳🌳🌳🌳), or “No Data” (ND). The thresholds for the assessment are presented and explained in Table 85. 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, which are mostly objective data derived from official sources, are presented in the annex tables (Tables 87-92).
- 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 🌳<sup>2</sup>. These were then combined to produce overview tables, by country group (Tables 76-78), which are 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 study 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 and whether policies, institutions, and policy instruments were in place to address the issues identified as being of importance. It should be pointed out that it has not been possible to develop as rigorous a method to assess the information on qualitative indicators as for the quantitative indicators. The aspects assessed are listed in Table 86.
- As they were for the quantitative indicators, countries were assessed on a five-“tree” scale for the qualitative indicators and the results were aggregated to the country group level.

The results are presented below, providing an assessment of the sustainability of forest management, by country group, on the basis of the quantitative and qualitative indicators, alongside comments drawing attention to the special features of each region and the reasons for the assessment.

This approach is a new one and, although based exclusively on official data and reliable scientific 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 study to enable an improvement in the future.

Two warning remarks are necessary:

- In many cases, low assessments (🌳🌳 at the country group level) result from the failure of several large<sup>3</sup> countries to provide information on that particular indicator, as “No Data” has been considered equivalent to 🌳 - the lowest ranking. In the authors’ view this is necessary as there is no evidence to support any other ranking. Assessing SFM is not possible if there are no data to monitor performance. Furthermore, it could be said that management decisions based on insufficient information are not really sustainable.
- For several indicators, despite the best efforts of correspondents and reviewers, it is clear that the data received are not fully comparable among countries<sup>4</sup>. Rather than abandon the effort to assess these dimensions of SFM, which would have seriously distorted the overall result by omitting relevant aspects, the authors have preferred to include these data in the tables and to 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 which is presented in the next section. Section 4 addresses the question of whether enough information is available for policy development and whether policies and institutions for SFM are in place, while section 5 contains conclusions and recommendations on sustainability of forest management in Europe.

Table 76: Assessment by indicator and country group, quantitative indicators

Indicator	Title	Russian Federation	North Europe	Central-West Europe	Central-East Europe	South-West Europe	South-East Europe
1.1	Forest area	🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲
1.2	Growing stock	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲
1.3	Age structure and/or diameter distribution	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲
1.4	Carbon stock	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲🌲	🌲🌲🌲
C1 average	Forest resource and carbon stock	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲
2.1	Deposition of air pollutants	🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲	🌲	🌲
2.2	Soil condition	🌲	🌲🌲🌲	🌲🌲	🌲🌲	🌲	🌲
2.3	Defoliation	🌲🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲
2.4	Forest damage	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲
C2 average	Health and vitality	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲
3.1	Increment and fellings	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲
3.2	Roundwood	🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲	🌲🌲🌲🌲	🌲🌲🌲
3.3	Non-wood goods	🌲🌲	🌲🌲	🌲🌲🌲🌲	🌲🌲	🌲🌲🌲🌲	🌲🌲
3.4	Services	🌲🌲🌲	🌲🌲	🌲🌲🌲	🌲	🌲	🌲
3.5	Forests under management plans	🌲🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲
C3 average	Productive functions	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲
4.1	Tree species composition	🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲
4.2	Regeneration	🌲🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲
4.3	Naturalness	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲
4.4	Introduced tree species	🌲🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲
4.5	Deadwood	🌲🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲
4.6	Genetic resources	🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲
4.7	Landscape pattern	🌲	🌲🌲🌲🌲	🌲🌲	🌲🌲	🌲🌲🌲	🌲🌲🌲
4.8	Threatened forest species	🌲🌲🌲	🌲🌲	🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲
4.9	Protected forests	🌲🌲	🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲
C4 average	Biodiversity in forest ecosystems	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲
5.1	Protective functions: soil and water	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲
5.2	Protective functions: infrastructure etc.	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲
C5 average	Protective functions	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲
6.1	Forest holdings	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲
6.2	Contribution of forest sector to GDP	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲

<sup>2</sup> The authors believe that it is not possible to manage forests sustainably in the long run without adequate information on the real status and trends (so that any outcome is essentially the result of chance and intuition rather than fact-based policy making): 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 rating if no data are available. If "No data" had been given an "average" assessment, say 🌲🌲🌲, a misleading picture of the situation would have been created.

<sup>3</sup> Lack of data for small countries that have negligible forest areas have little influence on the assessment as all the results are weighted by land area to obtain country group data.

<sup>4</sup> Indicators for which the key parameters present a serious problem of lack of comparability of data supplied include 2.4 (forest damage), 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).

6.3	Net revenue	🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲	🌲🌲🌲	🌲
6.4	Expenditure for services	🌲🌲🌲	🌲🌲	🌲🌲🌲🌲	🌲🌲	🌲🌲🌲🌲🌲	🌲
6.5	Forest sector workforce	🌲🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲	🌲🌲	🌲🌲🌲	🌲🌲
6.6	Occupational safety and health	🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲
6.7	Wood consumption	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲	🌲🌲🌲	🌲🌲
6.8	Trade in wood	🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲
6.9	Energy from wood resources	🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲	🌲🌲🌲
6.10	Accessibility for recreation	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲	🌲🌲	🌲
6.11	Cultural and spiritual values	🌲🌲🌲	🌲🌲	🌲🌲🌲🌲	🌲🌲	🌲🌲🌲	🌲
C6 average	Socio-economic functions	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲	🌲🌲

Table 77: Assessment by indicator and country group, qualitative indicators

Indicator	Title	Russian Federation	North Europe	Central-West Europe	Central-East Europe	South-West Europe	South-East Europe
A1	National Forest Programmes (NFPs)	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲
A2	Institutions	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲
A3	Legal/regulatory framework and international commitments	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲
A4	Financial instruments/economic policy	🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲	🌲🌲🌲	🌲
A5	Informational means	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲
Part A average	Overall policies, institutions and instruments for sustainable forest management	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲
B1	Land use	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲	🌲🌲🌲	🌲🌲🌲
B2	Carbon balance	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲
B3	Health and vitality	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲
B4	Production and use of wood	🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲
B5	Production and use of non-wood goods and services, particularly recreation	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲
B6	Biodiversity	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲
B7	Protective forests and other wooded land (OWL)	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲🌲
B8	Economic viability	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲🌲
B9	Employment, including safety and health	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲🌲
B10	Public awareness and participation	🌲🌲🌲🌲	🌲🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲🌲
B11	Research, training and education	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲
B12	Cultural and spiritual values	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲
Part B average	Policies, institutions and instruments by policy area	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲

### 3. Results and commentary, by country group

#### Overview of results

Detailed information by quantitative indicator is in Table 76, and by qualitative indicator in Table 77. The same data are summarised for each country group in the appropriate section. The data by country for the key parameters are in Tables 87-92. For the rest of this chapter, references in brackets are to the data for the quantitative or qualitative indicator which is being addressed, for instance (1.1) or (B.11). The background to these indicators has been described in more detail elsewhere in this study and is not repeated here. The basic data are exactly the same as those in parts I and II of SoEF 2011. Any information not collected through the SoEF process is referenced. The important question of availability of data for assessment of SFM is addressed through maps which show the percentage of key parameters for which data are available<sup>5</sup>.

#### Russian Federation

This is the only "country group" with a single member<sup>6</sup>, because of the size and special characteristics of the Russian forest resource, which is the largest in the world, with a much higher share of forest untouched by man than all other European countries. The Russian forest is predominantly boreal in nature, although many other forest types are represented across its huge extent. Intensive management, of the sort common in many other parts of Europe, is simply not possible on the scale of the Russian Federation, which has 5.6 ha of forest per capita and covers eight time zones. The process of transition from a centrally planned economy is on-going, and a new Forest Code was approved in 2006 after intense discussion. Russian forests have enormous economic and biodiversity significance at the global level, but the problems of monitoring them are immense. Data were available for over 90 percent of the key parameters (Figure 101).

#### Forest resources and global carbon stock

The reported area of Russia's forests has been stable over the past 20 years, although the area of other wooded land has declined slightly (1.1). Growing stock per hectare of forest available for wood supply has been rising steadily, at just less than 0.1 m<sup>3</sup>/ha/year (1.2). The age class structure is balanced, apart from a "gap" in the 60-80 year class, due to overfelling during the Second World War (1.3). The reported data on carbon stock show a very small decrease over the 20-year period, but the correspondent points out that this is well within the margin of error of the estimate and cannot be taken as a firm trend (1.4).

New forms of access to forest, through leasing and other means, have been introduced in the Forest Code 2006. The policy objective is to increase forest area by 180 000 ha/year for 3 years (B.1). Preparatory measures are in hand to establish carbon sequestration plantations

in the Russian Federation, and pilot plantations are being put in place (B.2).

#### Health and vitality

Over 24 percent of the land area of North-West Russia<sup>7</sup>, nitrogen depositions exceed the critical load established under the ECE Convention on Long Range Transboundary Air Pollution (2.1). There are no data available here on soil condition (2.2) as the Russian Federation is not a member of the Biosoil programme. In North-West Russia, only 6.2 percent of the sample trees were in defoliation classes 2+3+4, with no comparable data for the rest of the country (2.3). The Russian Federation reports forest damage from biotic and abiotic causes at 0.5 percent of the forest area and from fire at 0.12 percent (2.4). The extensive fires in 2010 were not covered as the reference year for damage was 2005.

The Russian Federation has policy instruments and institutions in place to monitor forest damage (including from radioactivity) and to protect forests from these dangers (B.3), which is particularly challenging given the vast extent and remoteness of the forests in question.

#### Productive functions

Reported fellings are around 20 percent of net annual increment (NAI) (3.1), considerably less than the 40 percent recorded around 1990, before the significant drop in harvest associated with the "transition recession" of the mid-1990s. The value of marketed roundwood per 1 000 m<sup>3</sup> growing stock (3.2) is about EUR 25, much lower than the European median value of EUR 713, and a clear indication that the resource could, in theory, be more intensively used. The value of marketed non-wood goods and marketed services is also considerably below the European average, which is not surprising given the large areas and relatively small populations, as well as the remoteness of many forests (3.3, 3.4). All Russian forests are publicly owned, and 100 percent are reported as being under a management plan or an equivalent (3.5).

No specific objectives for wood production (B.4) were reported although the policy instruments to control harvesting are in place. For the first time, the non-wood goods and services are defined and objectives set out in the new Forest Code (B.5).

#### Biodiversity in forest ecosystems

The share of single species stands in the Russian Federation is 60 percent (4.1), but in conditions of the boreal forest this is a natural proportion and not a result of silvicultural practice. Almost all regeneration is natural (4.2), and less than 2 percent of forest and other wooded land is plantations (4.3) while 36 percent is "undisturbed by man", by far the highest proportion in Europe. Areas dominated by introduced tree species are

<sup>5</sup> Calculated as the number of key parameters for which data were in fact available as a percentage of the maximum possible. To avoid excessive weighting of criteria with many component indicators, the national aggregate is calculated as the average percentage of the criteria, rather than the total of all indicators. Both quantitative and qualitative indicators are included.

<sup>6</sup> One consequence of this is that the results for the Russian Federation are more "extreme" than for other "country groups" (more 🌲🌲🌲🌲 than any other group, and a high number of 🌲). This happens because, in multi-country groups, extreme values at the country level are attenuated by the process of averaging and weighting. This has not happened in the single member "country group" Russian Federation.

<sup>7</sup> The study under the ECE Convention covered 1.8 million km<sup>2</sup> of North-West Russia, not the whole country.

negligible (4.4). Deadwood is reported at about 21 m<sup>3</sup>/ha (4.5). Approximately 0.003 percent of the forest area is managed for *in situ* and *ex situ* gene conservation (4.6). This is a small percentage compared to other countries; in view of the size and homogeneity of the Russian forest resource, it may be inevitable that a relatively small share is devoted to gene conservation. The Russian Federation was not covered in the research project on landscape pattern used by SoEF 2011 (4.7), so information on fragmentation and connectivity is not available here. Data on most threatened forest species were supplied (4.8). Less than 2 percent of the area of forest and other wooded land is protected (4.9), but this is still a total protected area of about 17 million ha.

Russian policy on forest biodiversity (B.6) is to expand the area of protected forests and develop networks of virgin forest and high conservation value forests.

### Protective functions

8.5 percent of Russia's forest has been designated for the protection of soil and water and 8.1 percent for protection of infrastructure, etc.

A regulation of 2008 sets down the procedures for forest with protective functions (B.7).

### Socio-economic functions

All Russia's forests are publicly owned (6.1), although it is now possible for non-public enterprises to lease and manage forests, with concessions over long periods. The forest sector accounts for just less than 2 percent of gross value added in the Russian Federation (6.2). Factor income (i.e. net entrepreneurial revenue, but not taking labour costs into account) (6.3) is low, at around EUR 0.4/ha. This is not surprising in view of the many millions of hectares of forest which are inaccessible or untouched by man. Government expenditure for forest services (6.4) was also low on a per hectare basis (EUR 0.8/ha). The forest sector workforce has been declining but is still 0.6 percent of the total population (6.5). Data were received for non-fatal accidents for the forestry workforce (6.6), but the figure supplied (1.4 accidents per 1 000 workers) seems implausibly low, compared to countries with comparable conditions. Consumption of wood and wood products in the Russian Federation, at about 0.7 m<sup>3</sup>/capita/year, is just below the European average, while it is a strong exporter as net exports account for over 40 percent of consumption (6.8). The Russian Federation reports that only 0.8 percent of its energy production is from wood (6.9). Nearly all Russian forests are accessible for recreation, but a very small number of forest visits (0.01 visits/ha/year) was reported. The Russian Federation provided partial data on sites of cultural and spiritual value (6.11).

The forest tenure and management system in the Russian Federation was profoundly modified by the Forest Code in 2006, which addresses in particular the framework conditions for economic viability (B.8). The new enterprise structure gives full attention to achieving the objectives of protecting jobs and the social security of workers (B.9). The moulding of public opinion is recognised as a primary objective in the Forest Code, which also creates the necessary instruments (B.10). There are clear

objectives regarding education, training and research and a number of policy instruments and institutions (B.11). Sites of cultural and spiritual value have special protected status (B.12).

### Overall policies, institutions, and instruments for sustainable forest management

The Russian Federation has several processes similar to an NFP, such as a "federal target program" for forest and several strategies, which are mostly iterative and consultative (A1). It provided full information about its institutions and legal instruments (A.2, A.3). The main legal instruments are decrees and orders of the government of the Russian Federation, although the Forest Code was approved by the Parliament. The Russian Federation provided some information about financial instruments and economic policy for the forest sector (A.4), but very little quantitative information on public expenditure per hectare of forest. It also provided information about forest-related informational strategy (A.5), although there is no formal communication and outreach strategy.

Figure 101: Russian Federation – percent of key parameters for which data are available



## North Europe

The high level of forest cover in North Europe naturally gives all forest-related questions high importance in the region. In most cases the forest sector is well organised and focused on wood production, with a sophisticated institutional structure. Most of the forest is boreal forest. In all countries of the region, except Iceland, data were available for 80 percent or more of the key parameters.

### **Forest resources and global carbon stock**

Forest cover (1.1) is on average rather high in most countries of the region, including the European record levels of 76 percent in Finland and 75 percent in Sweden. As there is little scope to increase forest cover, forest area has remained stable in most countries, although it has expanded strongly in Iceland (where forest cover is low) and, more slowly, in Latvia and Lithuania. Growing stock (1.2) has been rising steadily, although expressed in per hectare terms it has dropped in those countries where area has been increasing fast, as newly planted forest has little growing stock per hectare. Silviculture in the region is based on even-age stands and the age structure (1.3) is mostly balanced. There has been a steady build up of carbon in woody biomass (1.4) over the period, except in Estonia, where it has been stable. The carbon build up has been particularly rapid in Denmark, Iceland, Latvia and Norway.

Most countries in the region aim to preserve, not increase, the forest area, with the exception of Denmark which aims for a significant increase (B.1). Almost all countries in the region have comprehensive policies for climate change mitigation including carbon sequestration in forests, but also use of wood energy, substitution for non-renewable materials, etc. (B.2).

### **Health and vitality**

In the Baltic countries and Denmark, nearly all the land area is considered at risk of eutrophication from nitrogen deposition (2.1), although the percentage is lower in Finland and Sweden, and much lower in Norway. The C/N ratio (2.2) is approaching the warning level in Latvia and Denmark but is significantly above it elsewhere. The percentage of dead or damaged trees (2.3) is around or below 20 percent in all countries of the region. In general the percentage of forest damage (2.4) appears rather low, although there may be problems of comparability.

The countries of North Europe have in place systems to monitor forest damage and protect forests from damage (B.3).

### **Productive functions**

Productive functions, especially for wood, play a major role in North Europe. Despite this, the fellings/NAI ratio is less than 100 percent throughout the region (3.1), ranging from 41 percent in Denmark to 87 percent in Lithuania (no data for Iceland). In Estonia, the fellings/NAI ratio exceeded 105 percent in 2000, but since then has been maintained around 55 percent. In major North Europe countries, the value of marketed roundwood relative to growing stock (3.2) is exceptionally high, indicating intensive use of the resource to produce wood. This is particularly true for Finland (values around EUR 900/1 000 m<sup>3</sup> of

growing stock) and Sweden (around EUR 1 000/1 000 m<sup>3</sup>), far more than the European median of EUR 713/1 000 m<sup>3</sup>. Data are much weaker for the value of non-wood goods (3.3), with no data for Latvia and Sweden, and generally low values, compared to the European average, in other countries of the region, no doubt because of the lower population pressure on the forests, as well as the traditional rights of free access to non-wood goods such as berries and mushrooms. A major exception to this is Denmark, where the Christmas tree industry generates very high revenues. For the value of marketed services (3.4), only Iceland, Lithuania, Norway and Sweden were able to provide information. Iceland had especially high per hectare values for marketed services, including many not mentioned by other countries such as carbon sequestration, land rental for summerhouses, payments for gravel extraction and passage of power lines and for land reclamation. Finland, Lithuania and Sweden report that all their forests are under a management plan or an equivalent (3.5), but the comparability problems of this indicator are well known, and there is certainly no reason to believe that the forests in other countries of the region are unmanaged, even if, especially for private forests, the management plan is not explicit.

The North Europe countries mostly have policy objectives for the production and use of wood (B.4) including, in some countries, quantitative targets for increased production. For non-wood goods and services (B.5), objectives are less clearly stated and are mostly of a "framework" nature, without quantified goals.

### **Biodiversity in forest ecosystems**

In North Europe, natural tree stands have fewer species than in other parts of Europe, so it is not surprising that most countries have quite high proportions of single species stands (4.1). In North Europe, a high proportion of single species stands does not indicate a preponderance of artificial "monocultures". Standard silvicultural practice in the region, mimicking natural processes, is natural regeneration, often with seed trees, and most countries have 50-80 percent natural regeneration (4.2), with more in Norway (86 percent) and Estonia (93 percent). Exceptions are Iceland, where most forests are recently established plantations, and Denmark, where natural regeneration is around 20 percent. In Finland and Iceland, there is a downward trend in the share of natural regeneration. Most countries in North Europe have less than 5 percent plantations (4.4), often much less. Exceptions are Iceland (26 percent) and, above all, Denmark, which has 76 percent plantations. The amount of deadwood per hectare in northern Europe is mostly above the European average, although it is not yet possible to say what "appropriate" levels of deadwood (4.5) are. Latvia pointed out that deadwood had increased after a major storm. Finland and Sweden manage a relatively small proportion of their forest for gene conservation, but elsewhere in the region, this share is 0.15 percent or more (4.6). In most countries of the region the forest is not very fragmented (with the exception of Denmark and, to a lesser extent, Lithuania), and the trends are positive (4.7). Only Estonia, Finland and Sweden have nearly complete data on threatened forest

species (4.8), and even then for only one year, so it is not possible, because of data limitations described in the main chapter, to say what is the situation in North Europe, still less to identify trends. Denmark, Estonia, Finland, Latvia and Lithuania have 15-20 percent of their forest and other wooded land area protected for the conservation of biodiversity (4.9), but Iceland, Norway and Sweden have between 2 and 8 percent. This discrepancy between apparently similar countries may arise from differing conceptions of "protection", rather than real differences in practice.

Conservation of biodiversity is fully integrated in the forest institutions and instruments in the region (B.6), although few countries have quantified targets in this area.

### **Protective functions**

All countries in North Europe were able to supply information on the area of forest with protective functions (soil and water) (5.1), although only Estonia had a system to designate this area formally. Only Lithuania was able to provide this information for protective forests (infrastructure) (5.2); for many countries 5.2 was included in 5.1.

Protective functions are usually included in the main forest law (B.7).

### **Socio-economic functions**

Forests are very important to the society and economy of North Europe, more than in other, less-forested, more urban regions. There are very many private forest owners in North Europe. In Finland, Latvia, Lithuania and Sweden, the number of private forest holdings (a proxy for the number of private forest owners, which is not known) is between 17 and 24 percent of the rural population (6.1). In contrast, private forest holdings in Denmark and Iceland were only about 3 percent of rural population. The forest sector accounts for more than 1 percent of the national gross value added (6.2) in five countries: Finland (5.1 percent), Latvia (3.3 percent), Sweden (3.2 percent), Estonia (2.8 percent) and Lithuania (2.0 percent). The region's forests provide significant income for their owners, with net entrepreneurial revenue (6.3) around EUR 75/ha in Finland and EUR 50/ha in Sweden, less elsewhere<sup>8</sup>. Only fragmentary information was available on government expenditure for forest services (6.4), although in Sweden there is a clear upward trend, reaching EUR 174/ha in 2010. The forestry workforce (6.5) is also significant, accounting for more than 1 percent of the population in five countries: Latvia (2.4 percent), Estonia (1.8 percent), Lithuania (1.4 percent), Finland (1.3 percent) and Sweden (1.1 percent). The data supplied on occupational safety and health (6.6) seem to indicate that the number of accidents per 1 000 workers is relatively low in this region, but there are still too many anomalies in the data for country comparisons. The consumption of forest products (6.7) in North Europe is at very high levels, in part because some of the material "consumed" is later exported as value added products. Four countries in the region (Denmark, Estonia, Finland and Sweden) are among the highest per capita consumers of forest products in Europe, with over 3 m<sup>3</sup> roundwood equivalent/capita/year. Four countries in the region are strong net exporters (Finland, Latvia, Norway

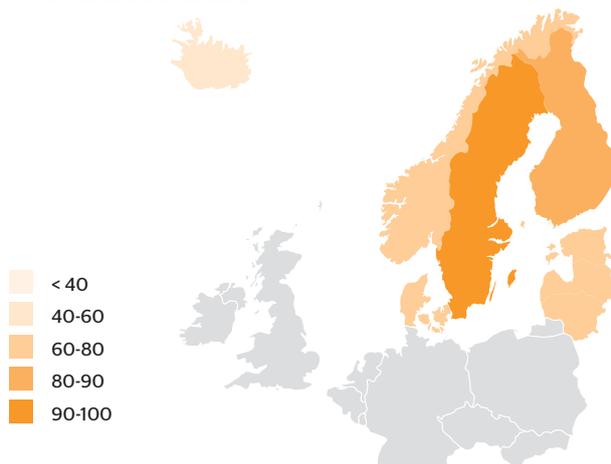
and Sweden), while Denmark is a strong net importer (6.8). Energy from wood (6.9) plays a big role in most North Europe countries, especially those which have high forest cover and no domestic fossil fuel resources. In four countries (Finland, Latvia, Lithuania and Sweden) wood energy accounts for more than 20 percent of national energy production. In North Europe, practically all forests are accessible to the public, typically by an ancient common law right of free access (6.10), and three countries (Finland, Latvia and Norway) report high levels of forest visits per capita. Five of the eight countries of North Europe have at least partial data on cultural and spiritual sites (6.11). Sweden has identified over 600 000 cultural heritage sites in forests.

All countries have policy objectives for economic viability (B.8), but these are mostly general in nature. Only Finland reported a quantified objective (to increase value of production by 20 percent by 2015). For employment (B.9), many countries reported objectives in the area of safety and health/working environment, while Finland also stated that the attractiveness of the sector should be enhanced. Most countries in the region reported policy objectives in the field of public awareness (B.10), as well as for research, training and education (B.11). Five countries reported on arrangements for protection of cultural and spiritual values (B.12).

### **Overall policies, institutions, and instruments for sustainable forest management**

Seven of the eight countries in North Europe reported NFPs or similar (A.1), which were almost all iterative, participatory and involved other sectors, although three dated from 2003 or earlier. The same seven provided full information on the institutional and legal/regulatory frameworks (A.2, A.3). In all seven, the fundamental forest legal framework is at the level of Parliament or the constitution, and forest legislation recently has been amended. They provided information on the economic policy and financial instruments related to the forest sector (A.4), but only four supplied quantitative information on public expenditure for forests. Six provided information, sometimes partial, on informational means used to promote sector policy objectives (A.5): four of these had a formal communication and outreach strategy.

**Figure 102: North Europe - percentage of key parameters for which data are available**



## Central-West Europe

Central-West Europe contains many densely populated and highly prosperous urban countries, although there are significant rural and mountainous areas. This strongly influences the trends for forests and management priorities. In general forest issues are not central to these countries' economies or societies, although populations have tended to react strongly to threats to their forests. Data were available for more than 80 percent of key parameters in all countries of the region except Ireland, Netherlands, Liechtenstein and Luxembourg (Figure 103).

### **Forest resources and global carbon stock**

In most countries, forest cover (1.1) has been expanding steadily over the last 20 years, with above average rates in Ireland and Switzerland. Growing stock (1.2) has also been accumulating in all countries of the region. Growing stock per hectare has increased by more than 1 m<sup>3</sup>/ha/year on average over the past 20 years in all countries except Switzerland, which is taking measures to reduce its very high stocking levels, and Ireland, where the rapid increase in forest area through afforestation has brought down average growing stock per hectare. The age class structure (1.3) is generally balanced, although strongly influenced by past afforestation<sup>9</sup>. Carbon stock in forests (1.4) has been increasing in all countries over the past 20 years, at rates between 0.8 percent/year (Austria) and 2.2 percent/year (Germany).

Most countries in Central-West Europe have an objective to maintain forest cover, or even prevent unwellcome increases, as in Switzerland. However, Ireland, the Netherlands and the UK have quantified targets for forest expansion (B.1). All countries are signatories to the Kyoto protocol and most are members of the EU and therefore have specific climate change mitigation policy objectives, which were reported in some detail (B.2).

### **Health and vitality**

All of the countries of Central-West Europe, except the UK, have a rather high percentage of their land area at risk of eutrophication because of nitrogen depositions (2.1). In four countries (Belgium, France, Germany and Ireland) the C/N ratio is approaching the warning level, which indicates a possible imbalance possibly induced by excessive nitrogen input. The share of trees in defoliation classes 2+3+4 (2.3) is below 35 percent in all countries, and below 15 percent in Austria and Ireland. Of the five countries which reported forest damage by abiotic and biotic causes (2.4), Ireland and the UK reported damage under 0.5 percent, Austria and Germany just over 2 percent and Liechtenstein over 10 percent. France reported an average of 0.1 percent of its total forest area damaged by fire every year, although most of the French forest is not in the fire-vulnerable Mediterranean zone.

All countries have institutions to monitor and combat forest damage to maintain its health and vitality, also from external threats such as pollution or climate change (B.3).

### **Productive functions**

Fellings are between 50 and 95 percent of NAI (3.1), except for Ireland and Luxembourg which have no data on NAI. In Switzerland, however, fellings have been allowed to rise to just under NAI because of a steep rise in natural losses, attributed to excessive stocking levels. Five of the ten countries in the region have exceptionally high values of marketed roundwood in relation to growing stock (3.2) (Austria, France, Ireland, Switzerland and the United Kingdom), indicating an intensive use of the resource. Countries reported mostly average values of marketed non-wood goods per hectare (3.3). Germany, however, reported a value eight times the European median value (game, ornamental plants and Christmas trees). Only five countries were able to report on the value of marketed services (3.4), with rather high values per hectare for Austria and Luxembourg. The share of forests under a management plan or equivalent (3.5) ranged from 57 percent to 100 percent, but several of the higher figures are based on assumptions, notably as regards management plans for private forests.

Almost all countries in the region reported policy objectives to increase wood supply and mobilisation, including for energy and, in some cases wood consumption, with associated policy instruments (B.4). In contrast the policy objectives for non-wood goods and services (B.5) are mostly concerned with regulation, and there are no specific objectives to increase supply of these goods and services.

### **Biodiversity in forest ecosystems**

In Central-West Europe, the share of single species stands (4.1) varies widely, from 6 to 56 percent, chiefly as a function of silvicultural choices. The share of single species stands is falling in Austria, France and the Netherlands. In Switzerland and Liechtenstein the share of natural regeneration is over 95 percent but very low in Ireland (11 percent) and the UK (24 percent), both of which have a share of plantations (4.3) over 75 percent. Belgium and Luxembourg also have 30-40 percent plantations, but elsewhere this share is below 10 percent, even negligible. This pattern is also reflected in the share of introduced species (4.4) which is over 40 percent in Belgium, Ireland and the UK, but much less elsewhere. Levels of deadwood (4.5) are high, especially in Austria, Germany and Switzerland, all of which have high stocking levels, but low, as would be expected, in the countries with much plantation silviculture. Most countries (except France and Switzerland) have about 0.08 percent of forest managed for gene conservation, with this percentage rather higher in some of the smaller countries (Belgium, Liechtenstein and Luxembourg) (4.6). In all of the countries in the region, except Austria and Liechtenstein, the forest landscape is rather fragmented, and the trends are negative in all countries except Ireland and Luxembourg (4.7). Austria and Switzerland were able to provide nearly complete information on threatened forest species (4.8), with weaker data elsewhere. All countries in the region except Belgium, Ireland and Luxembourg reported that protected areas were over 15 percent of forest and other wooded land (4.9).

<sup>8</sup> The very high figure for Denmark (EUR 320/ha) is not comparable as it was not possible to deduct labour costs - which are significant.

<sup>9</sup> In Ireland, nearly all stands are under 40 years old, and in the UK there is a strong peak of stands between 20 and 40 years old, with less both before and after.

All countries in Central-West Europe report detailed and specific objectives, with appropriate policy instruments, in the field of forest biodiversity (B.6), often linked to national biodiversity strategies and various EU instruments, such as Natura 2000.

### Protective functions

All countries in Central-West Europe except Ireland, Liechtenstein, Netherlands and the UK were able to supply information on the area of forest with protective functions (soil and water) (5.1). Austria and Belgium have systems to designate this area formally. Only Austria and Switzerland were able to provide this information for protective forests (infrastructure) (5.2), Austria with specific formal designation; for many countries, 5.2 was included in 5.1.

Protective functions are usually included in the main forest law (B7). In Switzerland, the objective is that, by 2020, 70 percent of the forests protecting against natural hazards comply with the target profiles of the national standard.

### Socio-economic functions

The number of private holdings (used as a proxy for the number of private forest owners) (6.1) is less than 2 percent of the rural population, except in Austria (5 percent), Luxembourg (16 percent) and France (23 percent)<sup>10</sup>, reflecting the relatively minor socio-economic importance of forest issues in most parts of Central-West Europe. Likewise in four of the countries of the region (Ireland, Luxembourg, Netherlands and the UK), the forest sector as a whole (including the forest industries) counted for less than 0.7 percent of national gross value added (6.2), although in Austria this share reaches 2 percent. In Belgium, France and, especially, Austria, net entrepreneurial revenue of forest owners (6.3) exceeded EUR 120/ha. However, in the Netherlands, Switzerland and the UK, net entrepreneurial revenue has been negative since 2000 at least. In other words, on average in those countries owning and running a forest will reduce the wealth of the forest owner (setting aside any fiscal advantages which may exist). Government expenditure for forest services (6.4) in those countries which supplied information was among the highest in Europe, notably in France (EUR 11/ha), Germany (EUR 14/ha), the UK (EUR 23/ha) and Switzerland (EUR 55/ha), although it is not clear to what extent these figures are comparable. In five countries of the region, the forest sector workforce (6.5) was less than 0.4 percent of the population, and between 0.4 percent and 0.9 percent in four. Non-fatal accidents (6.6) were below 35/1 000 workers in France, Ireland and the UK, with a strong downward trend in the latter two, although the information is still not comparable for this indicator and is strongly influenced by circumstances (slopes, storm damage). Levels of wood consumption (6.7) are very high in this country group, with Austria at nearly 3 m<sup>3</sup> wood equivalent/capita/year. For trade in wood products (6.8), Austria is a strong net exporter and the Netherlands and the UK are strong net importers. In the 20-year period, Germany made a structural shift, from net imports being 22 percent of consumption to net exports being 5 percent of consumption. In many countries of the region, wood accounted for

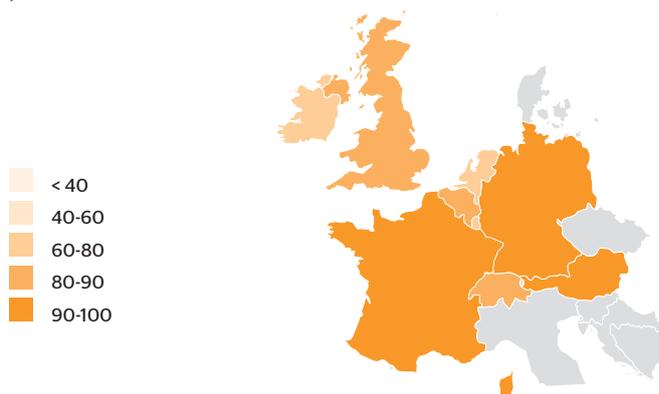
a negligible share of national energy supply (6.9), but in Austria and Liechtenstein, this share exceeded 30 percent. In almost all countries of the region, the forest is very accessible to the public (6.10), with particularly high levels of visits per hectare in the Netherlands and Switzerland. France, Germany and the UK were able to provide nearly complete data on sites with cultural and spiritual values (6.11), but others supplied partial or no data.

Countries in the region have incorporated objectives of economic viability (B.8) into their broader forest policy, mostly with the aim of maximising forests' contribution to economic growth. The importance of workforce issues, including training and safety and health, is also recognised (B.9), in most cases without specific policy objectives or programmes (these are often the responsibility of other ministries). Countries also describe the importance of improving public awareness of forest issues (B.10). Switzerland's NFP has an objective to make 80 percent of the population aware of forests. All countries described significant efforts by governments in the field of research, education and training (B.11). Countries which reported on cultural and spiritual values (B.12) mentioned policies and institutions to protect these (often not specifically forest-based) and a number of research programmes, but few specific policy objectives.

### Overall policies, institutions, and instruments for sustainable forest management

All countries in Central-West Europe have NFPs or similar<sup>11</sup> and, according to the partial information supplied, these are iterative, participatory and involve other sectors (A.1). Information was provided on the institutions responsible for forest policy (A.2), although sometimes this was not complete, notably in the case of countries where the major responsibility for forests is at a sub-national level, including Belgium, Germany, Switzerland and the UK. In all countries of the region the main forest instruments are in the constitution or at the level of laws passed by Parliament, and recently amended, with two exceptions (Ireland and the Netherlands) (A.3). All reporting countries provided information on the economic policy and financial instruments related to the forest sector (A.4), but only France and the UK were able to provide quantitative information on public expenditure for the forest sector. Most reported on informational means used to promote sector policy objectives (A.5), but only the UK reported an official outreach and communication strategy.

Figure 103: Central-West Europe - percentage of key parameters for which data are available



## Central-East Europe

This country group is very heterogeneous, running from Alpine states to the Caucasus and Volga basin. All countries in the group were centrally planned economies before 1989, but the transition process has moved faster in some (five of the nine countries are in the EU) than others. Most have strong traditional forest sector institutions. The five EU members all have data for more than 80 percent of the key parameters, but in Belarus and Ukraine this share is in the 60-70 percent range and in Georgia and Moldova, data are only available for about 30 percent of the key parameters (Figure 104).

### **Forest resources and global carbon stock**

Forest cover (1.1) has been expanding in most countries in Central-East Europe. This has been very fast in Belarus, where forest cover has expanded by 0.2 percentage points every year for the past 20 years through plantation and natural extension, and slightly more slowly in Hungary and Moldova (0.13 and 0.16 percentage points, respectively). In Georgia, forest cover declined from 40 percent to 39.5 percent over the past 20 years. Growing stock (1.2) has been accumulating strongly, at a rate of more than 3 m<sup>3</sup>/ha/year in the Czech Republic, Slovakia and Ukraine. The only exception is Hungary where average growing stock per hectare has fallen because of forest expansion. The age class structure of the region's forests (1.3) appears fairly balanced. Carbon in biomass (i.e. excluding carbon in soil, deadwood or litter) (1.4) increased by more than 1 percent/year in seven of the nine countries in the region.

Several countries in the region have a policy objective to increase forest area (B.1). In particular, Hungary aims to reach 27 percent forest cover by 2040, Slovakia to afforest marginal agricultural land, and Romania to add 2 million ha of forest. All reporting countries had detailed and specific policy objectives in the field of carbon balance (B.2).

### **Health and vitality**

The entire land area of Central-East Europe, with the exception of Romania, is considered at risk of eutrophication by excessive nitrogen deposition (2.1). The C/N ratio (2.2), which indicates the possibility of soil imbalance due to nitrogen input in forests, is near the warning level in the Czech Republic but not in the other countries in this region covered by the Biosoil project. In most countries of the region, the share of trees in defoliation classes 2+3+4 (2.3) is around or below 20 percent, but in Slovakia it is around 33 percent and in the Czech Republic over 50 percent. Hungary, Poland and Romania reported rather high levels of forest damage from biotic and abiotic causes (2.4), but there are doubts about how comparable these data are. Elsewhere in the region, low damage percentages were reported.

On the policy level, all reporting countries have institutions to monitor forest condition and damage (B.3) and measures to compensate for the damage done.

### **Productive functions**

In Central-East Europe the ratio of fellings to NAI (3.1) is between 35 percent and 78 percent (weak data from Georgia and no data from Moldova). In Slovakia this ratio rose from 57 percent to 79 percent between 2000 and 2010. In the Czech Republic and Hungary, the value of marketed roundwood (3.2) was at a very high level, over EUR 900/1 000 m<sup>3</sup> growing stock, indicating rather intense use of the resource, but was considerably lower in other reporting countries. In all reporting countries this ratio was much higher in 2010 than in 1990: this is a clear indication of increased intensity of use of the resource after the transition. Only three countries in the region supplied data on value per hectare of marketed non-wood goods (3.3), and for these three, the values were at the low end of the range. In this country group, only Slovakia supplied data on value of marketed services (3.4), but in that country, the value per hectare of these services was quite high (nearly EUR 120/ha). Five of the nine countries in the region reported that 100 percent of their forests were under a management plan or an equivalent (3.5), and in all eight reporting countries this percentage was over 85 percent.

The six countries which reported on policies for the use of wood (B.4) described balanced and detailed objectives. Three of them (Czech Republic, Hungary and Slovakia) mentioned objectives to increase wood production and consumption, notably for energy. For non-wood goods and services (B.5), the same six countries reported policy objectives which focused on regulating supply of non-wood goods and access to forests, mostly without quantified objectives.

### **Biodiversity in forest ecosystems**

The Czech Republic and Slovakia have less than 15 percent single species stands (4.1), but in the other four countries reporting on this indicator, this type of stand accounted for around 20-50 percent of the area. In most countries of the region, natural regeneration (4.2) accounts for most regeneration (over 95 percent in Georgia and Moldova), but is below 5 percent in the Czech Republic and Poland. Most countries reported a low share of plantations (below 6 percent, sometimes negligible), but Belarus and Romania recorded more than 20% plantations (4.3). Introduced tree species (4.4) account for less than 2 percent of the area of forest and other wooded land, except for Hungary, where introduced species (mostly *Robinia pseudoacacia* which is considered invasive in many circumstances) account for about 35 percent. Six countries reported on levels of deadwood (4.5), with very high levels in Ukraine and, especially, Slovakia. The Czech Republic, Moldova, Slovakia and Ukraine have an above average percentage of their forests managed for gene conservation, but others (Georgia and Hungary) have a rather low share (4.6). Of the six countries in the region with data on landscape pattern (4.7), Moldova's forest is very fragmented, while in Poland and Slovakia, fragmentation is

<sup>10</sup> The figure for Belgium - 53 percent - seems anomalous, either because of an underestimation of the rural population, or from a large number of urban forest owners in this densely populated country.

<sup>11</sup> Germany is at present developing a strategy for forests (Waldstrategie) which, however, is not yet complete, so the specific information provided to SoEF refers to an NFP which is now outdated.

decreasing. Six countries were able to provide some data on threatened forest species (4.8) with nearly complete data in the Czech Republic and Slovakia. Six countries reported protected areas over 12 percent of area of forest and other wooded land (4.9), with a very high share of protected forest in the Czech Republic (25 percent) and Slovakia (43 percent).

Six countries provided information on their policies in the field of forest biodiversity (B.6). These objectives are usually incorporated into the National Forest Programme and refer to international commitments, such as Natura 2000 and the Convention on Biodiversity. Ukraine reported the objective of increasing the share of forest protected for biodiversity.

### **Protective functions**

All countries in the region, except Moldova, provided information on the area of forest with protective functions (soil and water) (5.1). Belarus and the Czech Republic have a formal designation of these areas. Six of the nine countries provided similar information for protective forest (infrastructure) (5.2), again with formal designation in Belarus and the Czech Republic.

Protective functions are usually included in the main forest law (B7) with specific, but non-quantified, objectives incorporated into many national forest programmes.

### **Socio-economic functions**

In only two countries of the region, Czech Republic and Poland, is the number of private holdings (6.1) more than five percent of the rural population, despite programmes to restore and privatise forests. In Belarus, Georgia, Moldova and Ukraine, there are practically no private forests. In all reporting countries except Hungary, the forest sector contributes more than 1.5 percent of national gross value added (6.2), a relatively large share. In Slovakia, this share has dropped sharply, from 2.8 percent in 2000 to 1.1 percent in 2010, because of rapid growth in non-forest sectors. Most countries in the region were not able to provide data on net entrepreneurial income (6.3), and in two of those which did (Poland and Slovakia), the revenue was quite low (less than EUR 20/ha). Only four countries responded on government expenditure for forest services (6.4), but in two of these (Czech Republic and Hungary) government expenditure was more than EUR 10/ha. The forest sector is a significant job provider in the region: in two countries (Czech Republic and Slovakia), the forest sector workforce (6.5) was 1.2 percent of the population, and elsewhere in the 0.5-1.0 percent range. As regards occupational safety and health, most countries in the region report quite low rates of accidents (6.6), often below five per 1 000 workers. Comparison, among countries within the group and with countries in other groups, indicates that these data are not comparable and therefore should not be used for assessment purposes. Per capita consumption of wood (6.7) is around the European average in five countries, but in Georgia, Moldova, Romania and Ukraine, it is rather low, below 0.8 m<sup>3</sup>/capita/year. Two countries in the region are heavy net importers of wood and forest products (Hungary and Moldova) while two

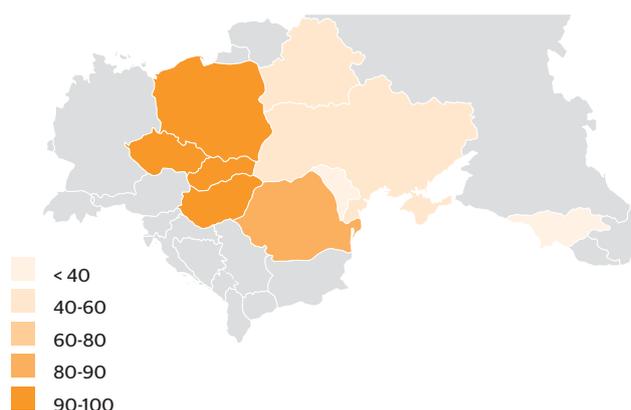
are strong net exporters (Belarus and Slovakia) (6.8). In Belarus, wood accounts for over 30 percent of national energy production (6.9), but elsewhere in the region, the reported share is quite low (although under-reporting of wood energy may still exist). Over 95 percent of forests are accessible to the forests in almost all the countries in the region (6.10), but there is very little information on intensity of use (visits/ha). Only two of the nine countries (Belarus and Slovakia) were able to provide near complete information on the number of cultural and spiritual sites and another (Hungary) partial data (6.11).

The importance of economic viability (B.8) is recognised by reporting countries and features in national forest programmes. Although most countries recognise the importance of employment aspects (B.9), there is very little formulation of specific policy objectives<sup>12</sup>. Some recognise that size of the forest sector workforce is declining through higher labour productivity. Increasing public awareness and understanding of forest issues (B.10) features in many national forest programmes. Countries reported on the structure of forest sector research and education (B.11). The responses on cultural and spiritual values (B.12) show that while all countries accept the importance of this dimension, there are many different views of what is meant by it.

### **Overall policies, institutions, and instruments for sustainable forest management**

Seven of the nine countries in Central-East Europe have NFPs or similar and, according to the partial information supplied, these are iterative, participatory and involve other sectors (A.1). Information was provided on the institutions responsible for forest policy (A.2), although sometimes this was not complete. In the seven reporting countries the main legal instruments for forests are recent and in the constitution or at the level of laws passed by Parliament (A.3). All except Belarus and Georgia provided information on the economic policy and financial instruments related to the forest sector (A.4). Hungary, Moldova, Romania and Slovakia provided quantitative data on public expenditure for the forest sector. Six reported on informational means used to promote sector policy objectives (A.5), but only Romania stated that it had a formal outreach and communication strategy.

**Figure 104: Central-East Europe - percentage of key parameters for which data are available**



### South-West Europe

This country group includes four countries with very small or negligible forest resources (Andorra, Holy See, Malta and Monaco) which have very weak information on almost all the indicators. The analysis, therefore, focuses on the remaining countries: Italy, Portugal and Spain, which have a distinctive Mediterranean forest on much, but not all, of their territory. Portugal has a major pulp and cork industry and intensive wood supply, strongly influencing the structure of the sector, while Italy and Spain, both very large countries, have a wide range of regional specificities. All are severely affected by forest fires. In Italy and Portugal, data are available on about 90 percent of key parameters, while in Spain the percentage is just under 80 percent (Figure 105).

#### **Forest resources and global carbon stock**

Forest cover (1.1) is about 35 percent, with significant growth in all three countries. Forest cover in Italy increased from 31 percent to 37 percent in the 20 years from 1990 to 2010. Growing stock (1.2) also accumulated by 1.5 m<sup>3</sup>/ha/year in Italy and by 0.5 m<sup>3</sup>/ha/year in Spain over the period as a whole (there was a reduction in average growing stock per hectare in Spain over the last decade as the forest area expanded through afforestation). In Portugal, however, growing stock per hectare has been dropping steadily, by 0.6 m<sup>3</sup>/ha/year. This is attributed to forest fires, although intensive forest management which maintains low stocking levels through short rotations may also have been a factor. The age class structure (1.3), where data are available, reflects the silvicultural history and practice of each country. In Portugal, for instance, there is a high proportion of young stands, because of afforestation after fire and the widespread use of short rotation eucalyptus coppice. Carbon stocks in living biomass (1.4) grew by over 2 percent per year in Italy and Spain, but only slightly in Portugal.

As regards policy objectives (B.1), in Italy the main objective is to protect the current forest area, while in Spain a further expansion (by 45 000 ha, with emphasis on short rotation coppice) is planned. With regard to carbon stocks and flows (B.2), the objectives are in accordance with Kyoto Protocol commitments, notably as regards increasing the sink capacity and maintaining the carbon pools.

#### **Health and vitality**

Over 80 percent of land area in Portugal and Spain is considered at risk of eutrophication (2.1), with about 60 percent in Italy. However, the C/N index is relatively high in all three countries, indicating little danger of soil imbalance due to nitrogen input. Less than 20 percent of trees in Portugal and Spain are in defoliation classes 2+3+4, while in Italy about 36 percent are in those classes. All three countries are subject to serious fires, although the area burned varies widely from year to year. On average about 0.5 percent of the forest area is burnt every year in Italy and Spain, but over 2 percent in Portugal.

For policy (B.3), Portugal has established a target for controlling forest fires (less than 100 000 ha by 2012), and all three countries have monitoring systems in place.

#### **Productive functions**

The ratio between fellings and NAI (3.1) in Italy and Spain is in the 35-40 percent range, whereas in Portugal, it reaches 75 percent. The value of marketed roundwood (3.2) varies widely. In Italy it is around EUR 400/1 000 m<sup>3</sup> of growing stock, but about EUR 1 000 in Spain and EUR 2 000 in Portugal, demonstrating the highly intensive use of the Portuguese resource. Likewise, the value of marketed non-wood goods (3.3) in Portugal reaches nearly EUR 100/ha, the highest in Europe, chiefly because of the cork industry, with values nearer the European average in Italy and Spain. No country in South West-Europe supplied data on value of marketed forest services (3.4). About ninety percent of Italy's forests are reported as being under a management plan or an equivalent (3.5). The corresponding figure in Portugal is 45 percent, but this includes only formally approved plans in a central data base, while in Spain, this information is at the level of the autonomous regions and only partial data were submitted.

As regards policy objectives, there are no quantified production targets except in the field of wood energy (B.4). There are few specific policy objectives about the supply of non-wood goods in South-West Europe (B.5).

#### **Biodiversity in forest ecosystems**

In Italy and Spain the share of single species stands (4.1) is between 18 and 26 percent, but in Portugal it reaches 72 percent (pine and eucalyptus stands). In Italy, the share of natural regeneration (4.2) is around 93 percent, while it is about 75 percent, with a slight downward trend, for Portugal. In Italy and Spain the share of plantations (4.3) is below 10 percent, but in Portugal it is around 26 percent. Likewise, the share of introduced species (4.4) in Italy and Spain is under five percent but about 29 percent in Portugal because of the very significant eucalyptus plantations supplying material for the pulp industry. Only Italy and Portugal were able to supply data on deadwood (4.5), reporting low to medium levels, although it should be stressed that not enough evidence is yet available to say what levels of deadwood are normal or desirable in specific types of forest. In Italy 0.66 percent of the forest is managed for gene conservation, but in Portugal and Spain, this share is rather low (4.6). In Spain and, especially, Portugal, there are high levels of forest fragmentation and negative trends for forest landscape pattern (4.7). Italy and Portugal were able to supply data on most of the threatened forest species (4.8), while Spain provided nearly complete data. Spain reported that over 18 percent of forest and other wooded land is protected (4.9), while Italy and Portugal reported a very high percentage of protected forest, around 45 percent.

All three countries reported forest biodiversity conservation policies in line with commitments in the framework of CBD and the EU, and coordinated with national biodiversity strategies (B.6).

<sup>12</sup> Poland states that "there are no specific policy objectives related to employment in the forest sector in Poland".

### Protective functions

Italy reported that over 80 percent of its forest had protective functions (soil and water) (5.1), and Portugal reported 7 percent. Spain reported that 24 percent of its forest had protective functions and that they had been formally designated "Montes de utilidad publica" (includes also protective forest under 5.2). Data supplied on forest with protective functions (infrastructure) (5.2) were fragmentary or included under 5.1.

Italy reported that national policy aims at the hydrogeological protection of mountainsides in order to prevent landslides, erosion and similar hazards, and that for this reason about 90 percent of forest land has been legally defined and cannot change use. Furthermore, about 500 000 ha of forest resources have been specially bound by means of regional laws and other provisions such as watershed management plans (B.7).

### Socio-economic functions

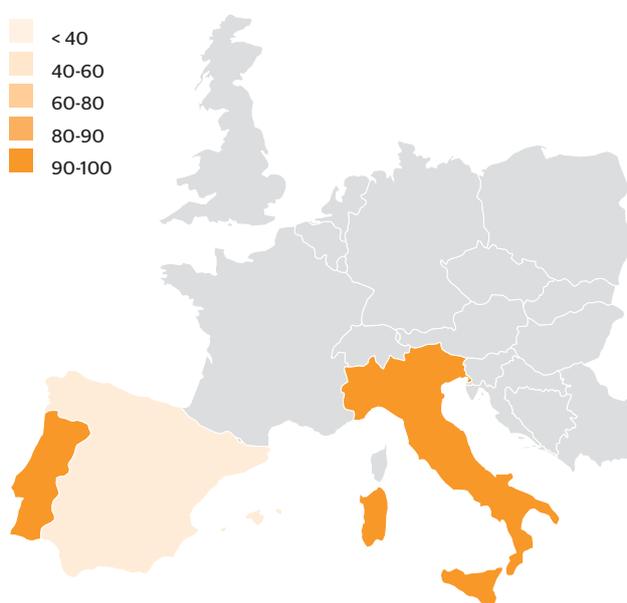
No data were supplied on private forest holdings (6.1) in South-West Europe, except for Spain which reported more than 21 million private forest holdings, mostly extremely small. It is likely that there are also very many private forest holdings in Italy and Portugal (although in the latter there are also large scale holdings of the forest industry). In Portugal the forest sector accounts for about 1.6 percent of national gross value added (6.2), one of the highest shares in Europe. In Italy, this share is 0.9 percent and trending downward. Portugal also has one of the highest average net entrepreneurial revenues (6.3) per hectare of forest (EUR 156), but this revenue is much lower in Italy and Spain. Both Italy and Spain report very high levels of government expenditure for services (6.4) per hectare, at EUR 34 and EUR 72, respectively. In Portugal, the forest sector workforce (6.5) is about 0.9 percent of the population, and in Italy and Spain around 0.45 percent. Both Italy and Spain reported quite high levels of accidents in the forest workforce (6.6) (no data from Portugal). Levels of consumption of wood and its products (6.7) in South-West Europe are around the European average. Portuguese net exports of wood and its products (6.8) are about 70 percent of national consumption, while the other countries in the region are moderate net importers. Wood accounts for just under 15 percent of national energy production (6.9) in Italy, and much more in Portugal<sup>13</sup>. Only Italy supplied information on accessibility (82 percent of the forest area) and visits (2.9 visits/capita/year) (6.10), both around the European average. All three countries provided data on cultural and spiritual values (6.11).

Only Italy provided information on policy objectives for economic viability (B.8), setting the framework for economic development. For employment (B.9), rather general policy objectives were reported. For public awareness (B.10), Italy and Portugal recognised the importance of communication and forest pedagogics, and listed some policy instruments. For research, education and training (B.11), Italy provided information on the major institutions. For cultural and spiritual values (B.12), Italy reported some arrangements made to identify relevant sites, but mentioned no policy objectives.

### Overall policies, institutions, and instruments for sustainable forest management

Italy, Spain and Portugal all have NFPs or similar and, according to the partial information supplied, these are iterative, participatory, recent and involve other sectors (A.1). Information was provided on the institutions responsible for forest policy (A.2), although sometimes this was not complete. In the three countries the main legal instruments for forests are in the constitution or at the level of laws passed by Parliament (A.3). All provided some information on the economic policy and financial instruments related to the forest sector (A.4), but only Portugal was able to supply quantitative information on financial flows to support the sector. The three countries reported on informational means used to promote sector policy objectives (A.5), but only Italy reported a written governmental outreach and communication strategy.

Figure 105: South-West Europe - percentage of key parameters for which data are available



### South-East Europe

Most of the countries of the region are on the Balkan Peninsula which has a relatively high forest cover. However, over 60 percent of the region's surface area is in Turkey, which has extensive areas with very little forest cover. Most of the countries have rather large rural populations and low per capita income by European standards. Some have new institutions emerging from the conflicts in former Yugoslavia (so that data on trends are sometimes difficult to calculate). Fire is an issue all over the region. Data availability is a major problem in this country group. Only three countries (Bulgaria, Croatia and Slovenia) have information on more than 80 percent of the key parameters, with Cyprus and Turkey over 70 percent (Figure 106). To a certain extent, therefore, assessment of the sustainability of forest management in this country group is rather uncertain.

#### **Forest resources and global carbon stock**

Forest cover is expanding all over South-East Europe, with particularly fast rates in Serbia, Croatia and Bulgaria. The exception is Albania, where forest cover shrank from 38.1 percent in 1990 to 37.6 percent in 2010, as a result of overgrazing and population pressure, also from displaced people. Growing stock has also been increasing, by 5 m<sup>3</sup>/ha/year in Slovenia, and 1.2 m<sup>3</sup>/ha/year in Bosnia and Herzegovina, Bulgaria and Croatia. In Albania, growing stock per hectare fell by 0.2 m<sup>3</sup>/ha/year, as a result of over-cutting. Only two countries, Bulgaria and Croatia, supplied information on age class structure: in these countries it was balanced. Carbon stocks of living biomass grew in all countries, except Albania, and by about 1 percent a year or more in eight countries.

Six of the countries reported on their policy objectives as regards forest area (B.1) and on carbon balance (B.2) linking forest policies with climate change mitigation objectives.

#### **Health and vitality**

Nearly all the land area in the region is at risk of eutrophication due to nitrogen depositions (2.1) (except for Cyprus where the percentage is lower, and Turkey for which there are no data). For soil condition (2.2), only two countries (Slovenia and Cyprus) participated in the Biosoil project: for them the C/N ratio is not a cause of concern. For others, no data are available on soil condition. The percentage of sample trees in defoliation classes 2+3+4 (2.3) is below 26 percent in all countries in the region, and around 20 percent for many. Fire damage (2.4) is significant in many countries, ranging up to 0.67 percent.

Most of the responses concerning policy instruments (B.3) focused on monitoring arrangements, often within the context of international projects. Fire receives high political emphasis. In Turkey, most of the resources of the state forest organisation are devoted to managing fires (preventing and fighting fires).

#### **Productive functions**

Only four countries supplied information on the ratio between fellings and NAI(3.1), but it is possible to estimate the ratio for all except Turkey and the former Yugoslav Republic of Macedonia. In all of these the ratio was below 60 percent, except in Albania, where fellings were more than five times NAI in 2005. In Cyprus, the fellings/NAI ratio was over 110 percent in 1990, but fellings since then have been drastically reduced to reach 25 percent of increment. Seven countries reported on the value of marketed roundwood as compared to growing stock (3.2), and in all of these except Croatia the values were at or below the European average, indicating that the forest owners in the region have difficulty in recovering sufficient value from their silvicultural investment. For the value of marketed non-wood goods (3.3), only three countries (Montenegro, Slovenia and the former Yugoslav Republic of Macedonia) were near the European average while the others were well below it, reporting values less than EUR 1/ha/year. Only Croatia, Cyprus and Slovenia reported on the value of marketed forest services (3.4). Six countries in the region report that 100 percent of their forests are under a management plan or an equivalent (3.5), and two others report percentages of 62 percent and 83 percent.

Countries reported on their wood production policies (B.4). Bulgaria intends to raise wood harvest to 8 million m<sup>3</sup> by 2013. Cyprus, however, has decided that harvest should be reduced and all fellings from the public forest should only be undertaken to improve the forest's structure and vitality. Policies for the supply of non-wood goods and services (B.5) stress the necessity of balance and of sustainability.

#### **Biodiversity in forest ecosystems**

Albania, Bulgaria, Cyprus and Montenegro all have more than 40 percent of the forests in single species stands (4.1), but in Slovenia, this share is less than 5 percent. Natural regeneration is the dominant mode in South-East Europe, with a share above 50 percent everywhere, often around 90 percent (4.2). The share of natural regeneration rose over the past 20 years in Bosnia and Herzegovina and in Bulgaria, but fell in Turkey. There are significant variations in the importance of plantation forestry (4.3) in the region. Two countries have more than 20 percent plantations: Bulgaria (21 percent with a strong downward trend) and Turkey (33 percent with a strong upward trend). Five countries (Bosnia and Herzegovina, Croatia, Greece, Montenegro and Serbia) have less than 6 percent plantations, while Slovenia reports no plantations at all. Introduced species (4.4) play a negligible role in the region, not exceeding 5.8 percent in any country. Only four countries provided information on deadwood in forest stands (4.5), and the levels reported were higher than average. A rather high percentage of forests is managed for gene conservation in Turkey and, especially, Bulgaria, but this share is low in Croatia and Serbia (4.6). Forest landscape

<sup>13</sup> The figure reported - 62 percent of national energy supply - seems implausible, but certainly there is a large volume of wood energy supplied, both from traditional and modern wood burning and from black liquor in the pulp mills.

patterns are generally satisfactory in the region, as regards both status and trend (4.7). Only Croatia and Slovenia were able to provide nearly complete data on threatened forest species (4.8), while the other countries did not respond or provided partial data. In Albania and Slovenia, forests protected for biodiversity conservation (4.9) account for over 20 percent of the area of forest and other wooded land, and in Serbia for nearly 15 percent. However, in other parts of the region, the share of protected forest is quite low, ranging from 4 to 11 percent.

Eight countries reported on their policies to conserve forest biodiversity (B.6). Only Albania mentioned a specific goal to increase the area protected.

### **Protective functions**

Seven countries in the region were able to provide information on the area of protective forest (soil and water) (5.1), of which two (Serbia and Turkey) have a system of formal designation of these forests. Five provided information on protective forests (infrastructure) (5.2), with the same two countries reporting formal designation systems.

Protective functions are usually included in the main forest law (B.7) with specific, but non-quantified, objectives incorporated into many national forest programmes.

### **Socio-economic functions**

Most countries in the region supplied no information on the number of private holdings (6.1), but the four which did reported rather high numbers. In particular, the number of private forest holdings in Croatia and Slovenia is more than 30 percent of the rural population. In most countries of the region, the forest sector contributed less than 1.5 percent of national gross value added (Slovenia 1.8 percent) (6.2). Only three countries provided information on net entrepreneurial income of forest owners (6.3), with Slovenia near the European average with EUR 36/ha, but much less in Bulgaria and Greece. Three countries provided data on government expenditure for forest services (6.4): both Cyprus and Slovenia had an average over the period of about EUR 20/ha, but in Cyprus there has been a strong downward trend and in Slovenia a strong upward trend. In Slovenia, the forest sector labour force (6.5) is 1.2 percent of the population but in other countries of the region this share is less than 0.8 percent. Accidents for the workforce (6.6) were near the European average in the three countries which reported, but these data cannot yet be considered comparable. In seven of the 11 countries in the region, wood consumption per capita (6.7) was rather low, below 0.8 m<sup>3</sup>/capita. Slovenia, Bosnia and Herzegovina and Montenegro are net exporters of wood and wood products (6.8), but the other countries are self-sufficient or net importers. In three countries of the region (Slovenia, Bosnia and Herzegovina, and the former Yugoslav Republic of Macedonia), wood accounted for more than 10 percent of national energy supply (6.9), and in the others for between three and nine percent. In almost all countries in the region, practically all forests are accessible for recreation (6.10), with the exception of Cyprus where only 40 percent is accessible. There are very few data on number of visits, so it is not possible to monitor the inten-

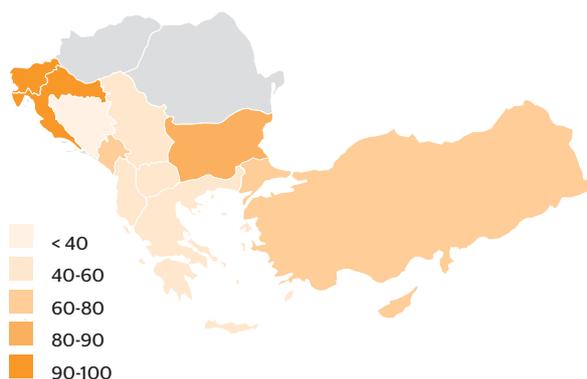
sity of forest use for recreation. Five countries supplied at least partial data on the number of sites with cultural and spiritual values, and Slovenia was able to provide nearly complete information on this parameter.

All responding countries mentioned policy objectives and instruments in place to ensure economic viability (B.8) alongside other aspects of SFM. Most, but not all, responding countries made similar provisions for employment (B.9) and public awareness (B.10). Six countries provided information on research, training and education framework and institutions (B.11). Fragmentary information on arrangements for cultural and spiritual values was provided (B.12). In Bulgaria, this was linked to the national tourism strategy.

### **Overall policies, institutions, and instruments for sustainable forest management**

Nine of the 11 countries have a national forest programme (A.1) and, according to the partial information supplied, these are mostly iterative, participatory and involve other sectors, although in Greece and Turkey the NFPs or similar do not satisfy all the MCPFE criteria for NFPs. Nine of the 11 countries provided full information about their institutional frameworks (A.2). The nine all report that the basic legal framework for the forest sector is at the level of the constitution or an act of Parliament (A.3) and is up to date. Eight countries provided information on financial instruments and economic policy for the sector (A.4), but only Bulgaria, Montenegro, Slovenia and the former Yugoslav Republic of Macedonia were able to report on financial flows in support of the sector. Eight countries provided information on forest-related informational strategy. Bulgaria, Slovenia and Turkey have a formal communication and outreach strategy (A.5).

**Figure 106: South East Europe - percentage of key parameters for which data are available**



#### 4. Issues about policy development and implementation

The previous section has addressed the content of policies, but for a country to achieve sustainable forest management, it must have an adequate policy framework and institutions, such as a national forest programme or an equivalent, a forest law and adequately resourced institutions to prepare and implement policy, etc. These have been covered under Part A of the qualitative indicators and summarised at the country group level above. There are, nevertheless, two broad questions about policy development which are of great importance, although it is hard to provide objective answers to them. These are briefly discussed below.

##### Are the available data adequate for sound policy making?

All rational policy making depends on the availability of reliable information, which should cover the present situation, recent trends, likely developments and the possible consequences of decisions. Is the information on sustainable forest management in Europe sufficient for rational policy making at the national level, and for reliable assessment of trends at the European level? This section addresses mostly the situation at the European level, for the purposes of this assessment, but it is likely that data shortcomings at the European level reflect problems at the national level.

Based on the data reported by countries for State of Europe's Forests (SoEF) 2011<sup>14</sup>, it appears that the quality, comparability and coverage has increased significantly since the previous report, SoEF 2007, thanks to constant efforts by national correspondents and international partners. The authors believe that the information base available for SoEF 2011 is adequate to describe and analyse in broad terms the trends in the European forest sector. Enough information is available to provide a broad picture for all criteria and all country groups.

However, there remain several important gaps and weaknesses, for particular indicators and particular countries:

- Indicators where data are missing for many countries: of the thirty-five key parameters used for the assessment (see list in Table 85), eight<sup>15</sup> had "No data" supplied by 20 or more countries. Five of the eight weak indicators were in Criterion 6 Socio-economic factors.
- Countries with significant problems of data availability: seven countries (setting aside the five countries with very small forest resources) had no data for 15 or more of the 35 key parameters<sup>16</sup>. Two of these countries are in Central-East Europe and five in South-East Europe.
- Indicators for which there are major problems of comparability: eight indicators present a serious

problem of lack of comparability of the data which were supplied. These are 2.4 (forest damage), 3.3 (marketed non-wood goods), 3.4 (marketed services), 4.5 (deadwood), 4.8 (threatened forest species), 6.4 (expenditure for services), 6.6 (occupational safety and health) and 6.10 (accessibility for recreation).

There are also weaknesses with regard to the qualitative indicators, in particular those in Part B, where many respondents did not succeed in formulating the specific policy objectives or linking the instruments in place to the policy objectives.

Policy making also requires analysis of the outlook, of the type undertaken by European Forest Sector Outlook Studies (EFSOS). Experience with this study, at present in preparation, indicates that several useful and robust models, working together, will be able to construct relevant policy scenarios, outlining the consequences of certain strategic policy decisions. However, this analysis will not be complete before the Ministerial Conference in June 2011. In the future, sustainability assessments should deal simultaneously with the current situation, past trends and the future outlook.

To summarise, the situation as regards information has improved significantly, but there are still weaknesses. If countries wish to have reliable information on which to base their policy formulation, they should make the necessary investment in data collection and analysis to a minimum standard, exchanging experience with other countries in the region. To keep expense within an acceptable limit, they should follow the framework of the criteria and indicator set and the analysis of SoEF 2011, participating in on-going international cooperation wherever possible.

A special effort is needed in the following areas:

- Those countries, mostly in Central-East and South-East Europe, which are unable to supply data on many indicators should ensure that their data collection is suitably reinforced. The major consequence of this investment would be better policy formulation in those countries which at present are, in effect, allowing their policy choices to be influenced by empirical evidence from other countries, as they have no independent fact finding capacity.
- Research should be undertaken to strengthen the coverage of Criterion 6 Socio-economic functions, as that is the least well documented, and disseminate the knowledge and experience of leading countries to others through international cooperation.
- The structure of data collection on the qualitative indicators needs to be reviewed with a view to further strengthen monitoring of changes in policies, and to enable better assessments of links between policy actions and empirical data "on the ground".

<sup>14</sup> An assessment of data quality and availability for State of Europe's Forests 2011 is available on [www.foresteurope.org](http://www.foresteurope.org) and [www.unece.org/timber](http://www.unece.org/timber)

<sup>15</sup> Indicators 2.2, 3.4, 5.2, 6.3, 6.4, 6.6, 6.10, 6.11. It should be borne in mind that five countries have very small forest resources and naturally cannot provide statistical information beyond the barest minimum.

<sup>16</sup> Central-East Europe: Georgia, Republic of Moldova. South-East Europe: Albania, Bosnia and Herzegovina, Greece, Montenegro, the former Yugoslav Republic of Macedonia.

### Are policies, institutions and policy instruments in place to address the main issues related to sustainable forest management?

Countries described their policies, institutions and instruments for sustainable forest management in Part A of the enquiry on qualitative indicators. These have been summarised at the country group level above. This information might be summarised at the European level (setting aside the five countries with very small forest resources) as follows:

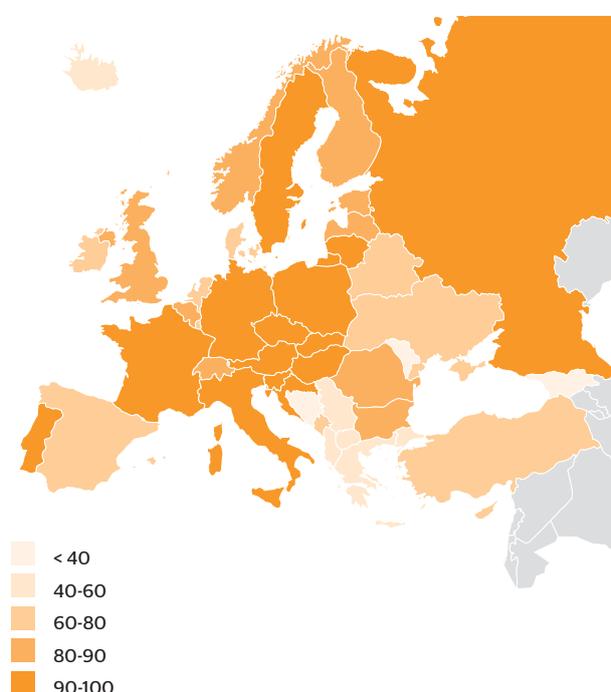
- All countries in Europe, except five<sup>17</sup>, have national forest programmes, mostly in conformity with the MCPFE guidelines for NFPs. These lay down a clear basis for a consistent and comprehensive forest policy framework, elaborated through a consultative, participatory process.
- All countries reported institutions (ministries, state forest agencies) and legal and regulatory frameworks (forest law, and related regulations) for sustainable forest management, although the format did not make it possible to verify the effectiveness and efficiency of these institutions.
- Although it appears that all countries have economic and financial instruments to promote sustainable forest management and significant sums are transferred in the context of numerous subsidy and incentive schemes as well as by fiscal measures, only 25 countries were able to provide quantitative information on public support to forestry, and this information was often partial and not comparable. In the absence of this type of information, it is not possible to say how effective these instruments are in achieving their objectives, and whether they are the most efficient means of promoting sustainable forest management. In the present situation of extreme pressure on all public expenditure, all sectors are being called on to justify any expenditure of public funds in their area of competence. It must be considered a weakness that the forest sector cannot demonstrate objectively that the economic instruments in place are the most efficient means of reaching the stated policy goals.
- Almost all countries reported that informational means are in place to support sustainable forest management, including forest pedagogic, information campaigns, research institutes, support to forest owners, etc. However, only ten countries<sup>18</sup> have a formal governmental outreach and communication strategy.

A major question is whether the forest sector institutions are able to handle the increasingly important relations with other sectors to produce genuinely integrated policy making. Most countries reported participation of other sectors in NFP processes, and some reported that there are links with, for example, renewable energy, rural development or biodiversity action plans. However, insufficient information is available on this important aspect.

It appears, therefore, that in most countries of the region, the basic framework and institutions are, in fact, in place and adapted to present circumstances. This basic framework includes a national forest programme, institutions with clear mandates and sufficient resources, an effective forest law and regulations, financial, economic and informational instruments for policy.

The main concern is about the "solidity" of forest policy making; is it strategic enough, sufficiently integrated in/coordinated with wider national development goals and strategies, and inclusive enough - involving other sectors and different stakeholders adequately? There are also concerns about the resources available for economic support and the efficiency of the policy instruments. More countries could formulate an official outreach and communication strategy.

Figure 107: Europe - percentage of key parameters for which data are available



## 5. Conclusions and recommendations

### Overview of the sustainability of forest management in Europe

This chapter has proposed a method for the objective and transparent assessment of progress towards sustainable forest management. This method is based on the FOREST EUROPE criteria and indicators for sustainable forest management, and uses the data supplied by countries, presented elsewhere in this report. Despite shortcomings, this method has produced results which appear sufficiently robust to be used for the broad picture of developments at the country group level. The data and method are not yet robust enough to assess individual countries, or to provide a single overall assessment for sustainability, which must be seen as the balance among all the criteria and the qualitative indicators. It is hoped that the method will be reviewed in detail and improved for future use.

An overview, by criterion and country group, is presented in Table 78. The detailed results by indicator have been presented and commented in section 3.

At the level of Europe, of the 48 assessments (6 country groups, 6 quantitative and 2 qualitative criteria), all except seven are at the level of 🌲🌲🌲 or 🌲🌲🌲🌲 (on a scale from 🌲 to 🌲🌲🌲🌲🌲), a result which may be considered satisfactory. Furthermore, most of the 🌲🌲 assessments at the country group/criterion level are due to lack of data, especially in South-East Europe, rather than the result of a situation or trend which causes concern. There is no evidence of systematic imbalance at the European level (such as systematically prioritising production over biodiversity or *vice versa*), which the indicator set is designed to detect. However, at the level of particular indicators, there are many situations assessed at 🌲🌲 and these “areas of

concern” are highlighted below. The availability of data for the key parameters is summarised in Figure 107.

### Sustainability of forest management, by country group

The situation by country group is summarised below, drawing attention to any major challenges for the country group. In the interest of prudence, the comments focus on areas of concern, without repeating the positive trends described in section 3.

#### Russian Federation

The Russian forest resource is the largest in the world, with a much higher share of forest untouched by man than any other European country. Most of the area west of the Urals is managed in a more intensive way, but to the east there is a huge expanse of remote forest with difficult and expensive access. The process of transition is ongoing, but all forests will remain in public ownership, with arrangements for long-term leases. A new Forest Code was approved in 2006 after intense discussion. The Russian forest has enormous economic and biodiversity significance, at the global level, but the problems of monitoring it are immense. There is concern about illegal logging in some parts of the Russian Federation, as well as about vulnerability of the boreal forest ecosystem to climate change (fires, melting of permafrost).

The assessment for the Russian Federation is 🌲🌲🌲 for criteria 1 (forest resource and carbon stocks), 2 (health and vitality), 3 (productive functions), 4 (biodiversity) and 6 (socio-economic functions) and Part A of the qualitative indicators, and 🌲🌲🌲🌲 for criterion 5 (protective functions) and Part B of the qualitative indicators (Table 79).

The more specific challenges for forest management in the Russian Federation can be identified by examining those indicators for which the assessment was 🌲🌲 or less.

Table 78: Assessment by country group and criterion, quantitative and qualitative indicators

	C1	C2	C3	C4	C5	C6	Part A	Part B
	Forest resources and global carbon stock	Health and vitality	Productive functions	Biodiversity	Protective functions	Socio-economic functions	Overall policies, institutions and instruments for sustainable forest management	Policies, institutions and instruments by policy area
Russian Federation	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲
North Europe	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲
Central-West Europe	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲🌲
Central-East Europe	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲	🌲🌲🌲
South-West Europe	🌲🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲🌲	🌲🌲
South-East Europe	🌲🌲🌲	🌲🌲	🌲🌲	🌲🌲	🌲🌲🌲	🌲🌲	🌲🌲🌲	🌲🌲🌲

<sup>17</sup> Belarus reported it has no NFP. Bosnia and Herzegovina, Georgia, Montenegro and Serbia did not report on this question, so it is assumed they have no NFP.

<sup>18</sup> Bulgaria, Denmark, Estonia, Finland, Italy, Romania, Slovenia, Sweden, Turkey, UK.

These challenges are:

- To prevent reduction in the area of forest and other wooded land (1.1)
- To obtain information on soil condition, in particular the C/N ratio (2.2).
- To address the issue of major forest fires like those which occurred in 2010 (2.4)<sup>19</sup>.
- To improve the value of marketed roundwood and marketed non-wood goods, as well as to collect information on the latter (3.2, 3.3).
- To examine the status and trends of landscape pattern, fragmentation and connectivity (4.7).
- To review what percentage of its forest species is threatened and, if necessary, take corrective action (4.8).
- To continue to increase the area of forest protected for biodiversity (4.9).
- To collect information on net entrepreneurial revenue of forest holdings (including publicly owned holdings) and ensure that it is at a sustainable level (6.3).
- To promote an increase in the consumption of wood and wood products (6.7).
- To generate more energy from wood, and monitor these developments (6.9).
- To collect information on forest use for recreation and develop this service (6.10).
- To collect and make available data on public expenditure for the administration, management and support of the forest sector, and take this into account in policy making (A.4).

### **North Europe**

In most of North Europe, the boreal forest is at the centre of the landscape (exceptions are Iceland and, to a lesser extent, Denmark). The forest sector is mostly privately owned, well organised, and focused on wood production, with an intensive use of the resource and a sophisticated and well resourced institutional structure. There is a strong commitment throughout society to achieving environmental objectives. Forest-related questions have a high policy importance in the region.

The regional average assessment is 🌲🌲🌲 for all quantitative indicators and Part A of the qualitative indicators, and 🌲🌲🌲🌲 for Part B of the qualitative indicators (Table 80).

The more specific challenges at the country group level can be identified by examining those indicators for which the country group assessment was 🌲🌲.

These are:

- To collect better information on marketed non-wood goods (3.3) and services (3.4).
- To gain a better understanding of the status of threatened forest species, monitor trends and take action if necessary (4.8).
- In a few countries, to increase the area of forests protected for the conservation of biodiversity, to meet the CBD target (4.9).
- To separate information on areas with protective functions (soil and water) (5.1) from those with

protective functions (infrastructure) (5.2) and, if appropriate, formally designate these areas.

- To collect better information on government expenditure for services (6.4), in order to understand better forests' contribution to the public good and how it is financed.
- To improve understanding and measurement of the cultural and spiritual functions of forests (6.11).

### **Central-West Europe**

Central-West Europe contains many densely populated and highly prosperous urban countries, although there are significant rural and mountainous areas, which is where most of the forests are. As a result, forest-related issues are not central to these countries' economy or society, although populations have tended to react strongly to threats to their forests. Forest institutions are stable and well resourced, even if they lack political weight relative to other sections of society which can mobilise more financial and human resources.

The regional average assessment is 🌲🌲🌲 for quantitative indicators, except for protective functions (🌲🌲) and productive functions (🌲🌲🌲🌲), 🌲🌲🌲 for Part A and 🌲🌲🌲🌲 for Part B of the qualitative indicators (Table 81). As regards protective functions, this reflects the fact that some countries where the protective function is relatively unimportant (notably because there are no or few mountains) have not made specific arrangements in this area.

The more specific challenges at the country group level can be identified by examining those indicators for which the country group assessment was 🌲, or for which in individual countries it was 🌲.

These are:

- To reduce nitrogen deposition as it may be exceeding critical limits for forest ecosystems (2.1).
- To take measures to conserve forest soils, which are in danger of imbalance in some areas (2.2).
- To reverse the trend towards forest landscape fragmentation (4.7).
- To gain a better understanding of the status of threatened forest species, monitor trends and take action if necessary (4.8).
- To separate information on areas with protective functions (soil and water) (5.1) from those with protective functions (infrastructure) (5.2) and, if appropriate, formally designate these areas.
- To consider whether forest management can be sustainable if net entrepreneurial revenue is consistently negative and to consider taking policy action in the few countries where this is the case (6.4).
- To consider the employment implications of forest sector developments (including forestry and the forest industries) although, because of the size of the non-forest economy, the forest sector in Central-West Europe will never be a major employer at the national level, even though it is important in several regions (6.5).

Table 79: Russian Federation - overall assessment

		Assessment	Areas of concern (some indicators at 🌲🌲 or below)
C1	Forest resources and global carbon stock	🌲🌲🌲	Decline in area of other wooded land, possible decrease in carbon stock.
C2	Health and vitality	🌲🌲🌲	Lack of data on soil condition and on defoliation outside North-West Russia.
C3	Productive functions	🌲🌲🌲	Low value of marketed roundwood compared to volume of resource. Low per hectare values for marketed non-wood goods and services.
C4	Biodiversity	🌲🌲🌲	Relatively small percentage of protected forest, and of area managed for gene conservation. No information on landscape pattern.
C5	Protective functions	🌲🌲🌲🌲	All indicators positive.
C6	Socio-economic functions	🌲🌲🌲	Low revenue and government expenditure per hectare. Small share of wood energy.
Part A	Overall policies, institutions and instruments for sustainable forest management	🌲🌲🌲	Little quantitative information on public expenditure.
Part B	Policies, institutions and instruments by policy area	🌲🌲🌲🌲	Objectives for wood consumption not clear.

Table 80: North Europe - overall assessment

		Assessment	Areas of concern (some indicators at 🌲🌲 or below)
C1	Forest resources and global carbon stock	🌲🌲🌲	All indicators positive at country group level.
C2	Health and vitality	🌲🌲🌲	Large area at risk from eutrophication, C/N ratio approaching warning level in two countries.
C3	Productive functions	🌲🌲🌲	Weak data on marketed non-wood goods, and marketed services.
C4	Biodiversity	🌲🌲🌲	Information gaps on threatened forest species, low percentage of forest protected for biodiversity in some countries.
C5	Protective functions	🌲🌲🌲	Inability to separate protective functions (soil and water) from those for infrastructure.
C6	Socio-economic functions	🌲🌲🌲	Only partial information on government expenditure for forest services and on sites with cultural and spiritual value.
Part A	Overall policies, institutions and instruments for sustainable forest management	🌲🌲🌲	All indicators positive at country group level.
Part B	Policies, institutions and instruments by policy area	🌲🌲🌲🌲	All indicators positive at country group level.

Table 81: Central-West Europe - overall assessment

		Assessment	Areas of concern (some indicators at 🌲🌲 or below)
C1	Forest resources and global carbon stock	🌲🌲🌲	All indicators positive at country group level.
C2	Health and vitality	🌲🌲🌲	High percentage of land area at risk of eutrophication from nitrogen deposition. Near warning level for soil imbalances in some countries.
C3	Productive functions	🌲🌲🌲🌲	All indicators positive at country group level.
C4	Biodiversity	🌲🌲🌲	Landscape pattern and fragmentation. Weak data on threatened forest species.
C5	Protective functions	🌲🌲	Inability to separate protective functions (soil and water) from protective functions (infrastructure).
C6	Socio-economic functions	🌲🌲🌲	Negative net entrepreneurial revenues in a few countries. Negligible share of wood energy in a few countries. Small share of total workforce in forest sector.
Part A	Overall policies, institutions and instruments for sustainable forest management	🌲🌲🌲	All indicators positive at country group level.
Part B	Policies, institutions and instruments by policy area	🌲🌲🌲🌲	All indicators positive at country group level.

<sup>19</sup> The overall reported percentage of forest damage in the Russian Federation is relatively low, but may be under-reported because of the remoteness of many forest areas, and does not include data for 2010, when wild fires caused major damage to settlements and agriculture as well as forests.

### Central-East Europe

The countries in Central-East Europe were all centrally planned 25 years ago, but many have now been transformed and are increasingly prosperous. Five countries in this group are now members of the EU. The transition process has been a challenge to forest institutions, but in many countries these institutions have retained their basis of traditional silvicultural values. Ecologically the country group is very heterogeneous, running from the Alpine states to the Caucasus and the Volga basin.

The regional average assessment is 🌲🌲🌲 for quantitative indicators, except for socio-economic functions (🌲🌲) and forest resources (🌲🌲🌲🌲), and 🌲🌲🌲 for all qualitative indicators (Table 82). The result for socio-economic indicators reflects the fact that the region is not very prosperous on average, although the EU members in the region are developing rapidly in this respect. There are also significant weaknesses as regards information on socio-economic aspects. Several countries did not report on the qualitative indicators, bringing down the regional average.

The more specific challenges at the country group level can be identified by examining those indicators for which the country group assessment was 🌲🌲.

These challenges are:

- To reduce nitrogen deposition as it may be exceeding critical limits in many areas (2.1).
- To take measures to conserve forest soils, which are in danger of imbalance from nitrogen input in some areas (2.2).
- To increase the value of marketed roundwood (3.2).
- To collect adequate information on marketed non-wood goods and marketed services, and use this information as a basis for policy making in the area. (3.3, 3.4).
- For those countries which do not have this information already, to participate in research work on landscape patterns to monitor trends and to take steps to reduce fragmentation where research shows this is necessary (4.7).
- To collect information on net entrepreneurial revenue of forest operations, private or public, and take policy measures, if it appears necessary, to ensure that net revenue from forest ownership or management is adequate (6.3).
- To collect information on government expenditure for forest services and, if necessary, consider adjusting it to society's needs (6.4).
- To monitor the number and characteristics of the forest sector workforce on a continuing basis to ensure that it is adequate to implement sustainable forest management (6.5).
- To ensure that wood makes a full contribution to national energy supply, and to put in place adequate monitoring systems for wood energy (6.9).
- To collect adequate information on use of forests for recreation, for instance the number of forest visits, and develop this function if the recorded levels are low or excessively concentrated (6.10).

- To collect adequate information on cultural and spiritual values of forests (6.11).
- To collect and make available adequate information on public expenditure on the forest sector (administration, regulation, management, support to private owners) and use it to develop efficient and effective forest sector support policies (A.4).

### South-West Europe

In South-West Europe, most countries have a distinctly Mediterranean forest on much, but not all, of their territory. There are threats from fire, nitrogen deposition, changes in landscape pattern and rural depopulation, but some areas are managed intensively, sometimes with introduced species. There are serious information gaps.

The regional average assessment is 🌲🌲🌲 for quantitative indicators, except forest resources (🌲🌲🌲🌲), and for Part A of qualitative indicators (overall policies and institutions), but 🌲🌲 for Part B Policies and instruments by policy area, chiefly because of non-reporting by large countries on several indicators (Table 83).

The more specific challenges at the country group level can be identified by examining those indicators for which the country group assessment was 🌲🌲. In South-West Europe, most of these concern the lack of information, which makes it difficult to achieve truly sustainable forest management, or indeed to know when it has been achieved.

These specific challenges are:

- To improve information on age structure of forests (which is mostly missing) (1.3).
- To reduce nitrogen deposition as it may be exceeding critical limits in many areas (2.1).
- To collect and analyse information on marketed services from forests (no responses from South West Europe) (3.4).
- To collect more information on regeneration methods and consider whether the share of natural regeneration might be increased in some countries (4.2).
- To carry out surveys of the level of deadwood in forest stands (4.5).
- To develop strategies to improve the forest landscape pattern (4.7).
- To improve information on contribution of forest sector to GDP where this has not been supplied (6.2).
- To improve information on supply and consumption of wood energy (6.9).
- To carry out surveys on recreation use of the forests, especially number of visits (6.10).
- To analyse better the specific objectives of forest policy in certain areas, whether objectives have been clearly identified and whether policy instruments are in place, notably as regards carbon balance, production and use of non-wood goods and services, protective forests, economic viability, employment (including safety and health), public awareness and participation, research training and education and cultural and spiritual values (Part B).

Table 82: Central-East Europe - overall assessment

		Assessment	Areas of concern (some indicators at 🌲 or below)
C1	Forest resources and global carbon stock	🌲🌲🌲🌲	Decline in forest cover in one country.
C2	Health and vitality	🌲🌲🌲	Entire land area at risk of eutrophication from nitrogen deposition. C/N ratio near warning level for soil imbalance in one country. Defoliation level also very high in one country.
C3	Productive functions	🌲🌲🌲	Weak data, and generally low per hectare values for marketed non-wood goods and services.
C4	Biodiversity	🌲🌲🌲	Landscape pattern: very fragmented forest in some countries and data missing on landscape pattern in others.
C5	Protective functions	🌲🌲🌲	All indicators positive at country group level.
C6	Socio-economic functions	🌲🌲	Weak data on net revenue (low values for those reporting) and government expenditure. Small share of total workforce in forest sector. Low levels of wood consumption. Reported share of wood energy low. Weak information on recreational use and sites with cultural and spiritual values.
Part A	Overall policies, institutions and instruments for sustainable forest management	🌲🌲🌲	Several countries provided little information on financial instruments for forests.
Part B	Policies, institutions and instruments by policy area	🌲🌲🌲	Several countries did not report on land use objectives.

Table 83: South-West Europe - overall assessment

		Assessment	Areas of concern (some indicators at 🌲 or below)
C1	Forest resources and global carbon stock	🌲🌲🌲🌲	Missing data on age class structure.
C2	Health and vitality	🌲🌲🌲	High percentage of land at risk of eutrophication due to nitrogen input. Significant fire damage.
C3	Productive functions	🌲🌲🌲	No data on value of marketed forest services.
C4	Biodiversity	🌲🌲🌲	Data missing on share of natural regeneration and levels of deadwood in some countries. High fragmentation and negative trends for forest landscape pattern in some countries.
C5	Protective functions	🌲🌲🌲	All indicators positive at country group level.
C6	Socio-economic functions	🌲🌲🌲	Data missing in some countries on share of forest sector in GDP, wood energy and number of visits.
Part A	Overall policies, institutions and instruments for sustainable forest management	🌲🌲🌲	All indicators positive at country group level.
Part B	Policies, institutions and instruments by policy area	🌲🌲	Incomplete or missing data for many indicators in Part B.

### South-East Europe

Most of the countries in South East Europe have rather large rural populations and low per capita income by European standards. Some have new institutions emerging from the conflicts in the former Yugoslavia. Fire is an issue all over the region. In one country, the forest itself is under severe pressure from overgrazing and overcutting (mostly for fuel) by the rural population. It appears that, in many areas, the forests are not intensively managed and not well protected for biodiversity, but information is very weak, so this cannot be demonstrated. The weakness of the information base is indeed a threat to sustainable forest management in South East Europe.

The regional average assessment is 🌲🌲🌲 for criteria 1 (forest resource and carbon) and 5 (protective functions), but only 🌲🌲 for criteria 2 (health and vitality), 3 (productive functions), 4 (biodiversity) and 6 (socio-economic functions). For ten of the indicators, the regional average

was only 🌲. The regional average assessment was 🌲🌲🌲 for Part A and Part B of the qualitative indicators (Table 84). The main reason for these relatively unsatisfactory results is the fact that many of the countries in South-East Europe have not supplied adequate information on the forest sector (and probably do not dispose of that information at all): without this information, it is not possible to say with any objectivity whether or not forest management is sustainable.

The more specific challenges at the country group level can be identified by examining those indicators for which the country group assessment was 🌲🌲 or 🌲.

These are:

- To collect information on age class structure for even-aged forests, and use this for forest sector and wood supply planning (1.3).

- To reduce nitrogen deposition as it may be exceeding critical limits for forest ecosystems in many areas (2.1).
- To take measures to conserve forest soils, which are in danger of imbalance from nitrogen input in some areas (2.2).
- To collect reliable information on both increment and fellings, and ensure that there is an adequate balance between them, to prevent deterioration of the resource (3.1).
- To collect information on marketed non-wood goods and marketed services, and use this to formulate ambitious policies in these areas (3.3, 3.4).
- To collect information on the species composition of the forests in the region and to consider whether the share of single species forest is appropriate for the circumstances (4.1).
- To collect information on deadwood in forest stands, and consider whether this is the appropriate level and, if not, what should be changed (4.5).
- To collect and analyse information on threatened forest species, and use it in their biodiversity conservation policy (4.8).
- To consider, in countries where the share of protected forest is below the CBD target, whether this share should be increased (4.9).
- To collect information on private forest holdings and, in general, on the number and characteristics of private forest owners (6.1).
- To collect information on the contribution of the forest sector to national income, in those countries which have not done so already (6.2).
- To collect information on the income of forest owners, public and private, and to examine whether it is adequate for sustainable forest management (6.3).
- To collect and analyse information on government expenditure for forest services, and consider whether it is adequate to ensure delivery of the services needed by society (6.4).
- To re-examine the potential of the forest sector as a source of rural employment, especially as many of the countries in South-East Europe are rural in nature (6.5).
- To set up systems to monitor the occupational safety and health of the forest workforce, and take appropriate action to improve it if necessary (6.6).
- To consider the promotion of consumption of wood and wood products (6.7).
- To collect information on how much of the forest is accessible for recreation and collect statistics on forest visits (6.10).
- To collect information on sites of cultural and spiritual value and, if necessary, take action to protect these sites (6.11).
- To ensure, where this is not already the case, that the NFP or similar in the country satisfies the agreed MCPFE guidance for NFPs (A.1).
- To collect adequate information on public expenditure on the forest sector (administration, regulation, management, support to private owners) and use it to develop efficient and effective forest sector support policies (A.4).

Table 84: South-East Europe - overall assessment

		Assessment	Areas of concern (some indicators at 🌲 🌲 or below)
C1	Forest resources and global carbon stock	🌲 🌲 🌲	One country with steeply falling forest cover and growing stock. Data mostly missing on age class structure.
C2	Health and vitality	🌲 🌲	Nearly all land area at risk of eutrophication due to nitrogen deposition. Data mostly missing on soil condition. Significant fire damage.
C3	Productive functions	🌲 🌲	In one country fellings greatly exceed NAI . Rather low per hectare values for marketed non-wood goods and data missing on marketed forest services.
C4	Biodiversity	🌲 🌲	Several countries with a high share of single species stands. Data mostly missing for levels of deadwood and on threatened forest species. In many countries, low share of forest protected for conservation of biodiversity.
C5	Protective functions	🌲 🌲 🌲	All indicators positive at country group level.
C6	Socio-economic functions	🌲 🌲	Data missing for several countries on many key parameters, including forest holdings, contribution of forest sector to GDP, net revenue, government expenditure for services, forest sector workforce, occupational safety and health, number of visits and of sites with cultural and spiritual values. Low levels of wood consumption.
Part A	Overall policies, institutions and instruments for sustainable forest management	🌲 🌲 🌲	Only a few countries provided quantitative data on economic support for the forest sector.
Part B	Policies, institutions and instruments by policy area	🌲 🌲 🌲	Several large countries did not reply to Part B or did not formulate objectives and link them to specific instruments.