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Criteria and Indicators for Sustainable Forest Management in Finland

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The Finnish criteria and indicators for sustainable forest management are based on the pan-European criteria and indicators. The preparation of the national criteria and indicators was initiated in Finland in the spring of 1994, and was carried out within two broad-based expert groups under the supervision of a Advisory Board, appointed by the Ministry of Agriculture and Forestry, with representation by the various interest groups. The goal was to produce criteria and indicators for sustainable forest management for use on the national, regional and local levels.

The criteria and indicators were tested in a pilot project launched in 1995 under the title of "*Implementation of the Development Strategy for Sustainable Forestry*" (called the Pirkanmaa project). The goal of the project was to establish principles for the development of the regional forest strategy, and to create indicators and monitoring procedures for the assessment of the sustainability of forestry on the regional level.

The pan-European criteria were adapted for national use with minor adjustments, and the list of indicators was reformulated and complemented to reflect conditions in Finland. A total of 160 indicators were developed. Compilation of data for the indicators for sustainable forestry was begun in 1996, and the first report containing detailed indicator-specific data was published in 1997 under the title "*Criteria and Indicators for Sustainable Forest Management in Finland*".

In 1998, the Ministry of Agriculture and Forestry appointed a working group to bring the national criteria and indicators up to date.

Similar projects for the creation of national criteria and indicators have been carried out in several European countries, including France, Germany and the Czech Republic. The international EU/Life project "Methods to Monitor Sustainable Forestry" is a joint project carried out by five countries with EU funding. The goal of the project is to present and compare the monitoring procedures of the countries. The definition of regional indicators is one of the aims of the Finnish sub-project.

The Criteria and Indicators for Sustainable Forest Management

The fulfilment of the criteria for sustainable forest management is monitored with respective indicators. The indicators can be descriptive or quantitative, and relevant data for them can be obtained, for example, from research, surveys, inventories, statistics, monitoring systems and reports. Each descriptive indicator describes a specific phenomenon and its status. Quantitative indicators, on the other hand, represent numerically measurable parameters. Often some aspect includes both a descriptive and a quantitative indicator. Target levels for the indicators – standards – have not been set in the reports.

In sustainable forest management:

Descriptive indicators are those

- Regulatory instruments – Forest Act, Nature Conservation Act, Building Act, Act on Reindeer Husbandry, etc.
- Institutional arrangements – law enforcement, forest policy measures and forest programmes, international agreements and organisations, etc.
- Economic instruments – funding and subsidies, forest taxation, etc.
- Informational instruments – systems for collecting information, training and consulting, guidelines, inter-organisational co-operation, etc.

which aim at ensuring the fulfilment of the criteria. Descriptive indicators also include other instruments, measures, agreements, etc. which affect the conditions for the fulfilment of sustainability, but which cannot be evaluated or measured numerically.

- *Quantitative indicators* are numerically quantifiable parameters.

Finnish Criteria for Sustainable Forest Management (Pan-European Criteria for Sustainable Forest Management) and Indicators

CRITERION	Indicators (D=descriptive, Q=quantitative)	
Criterion 1		
Maintenance and appropriate enhancement of forest resources and their contribution to global carbon cycles • Forest resources, indicators 1.1-1.6 • Carbon balance, indicators 1.7-1.9	D 1.1	Instruments to regulate the maintenance of forest resources
	D 1.2	Forest rights
	D 1.3	Regulation of the forest resource management through land use
	Q 1.4	Forests and other wooded land and their proportion of total land area
	Q 1.5	Total volume of growing stock
	Q 1.6	Age structure of forests
	D 1.7	Managing the carbon balance
	Q 1.8	Carbon balance
	Q 1.9	Use of wood-based energy
Criterion 2		
Maintenance of forest ecosystem health and vitality	D 2.1	Instruments to regulate the maintenance of forest ecosystem health and vitality
	Q 2.2	Deposition of air pollutants
	Q 2.3	Changes in the defoliation of forests using the UN/ECE and EU defoliation classification
	Q 2.4	Damage caused by biotic or abiotic agents
Criterion 3		
Maintenance and encouragement of productive functions of forests (wood and non-wood) • Wood products, indicators 3.1-3.8 • Non-wood forest products, indicators 3.9-3.11	D 3.1	Instruments for safeguarding wood production
	Q 3.2	Increment of growing stock
	Q 3.3	Total drain
	Q 3.4	Coverage of forest advisory services
	Q 3.5	Coverage of forest management

	planning Q 3.6 Silviculture and forest improvement Q 3.7 Profitability of private forestry Q 3.8 Structure of roundwood production D 3.9 Instruments to safeguard the management of forests related to non-wood products Q 3.10 Quantity and economic significance of non-wood forest products Q 3.11 Ecotourism
Criterion 4	
Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems	D 4.1 Instruments to regulate the maintenance, conservation and appropriate enhancement of biodiversity in forest ecosystems Q 4.2 Threatened and vulnerable species of flora and fauna Q 4.3 Protected forests and forests with felling restrictions Q 4.4 Valuable forest habitats and their protection Q 4.5 Tree species composition Q 4.6 Pure and mixed forest stands Q 4.7 Reserved and decayed trees in commercial forests and conservation areas Q 4.8 Gene reserve forests
Criterion 5	
Maintenance and appropriate enhancement of protective functions in forest management (notably soil and water)	D 5.1 Instruments for the maintenance and appropriate enhancement of protective functions in forest management Q 5.2 Water protection in harvesting and site preparation Q 5.3 Phosphor and nitrogen load on water systems caused by logging Q 5.4 Water protection plans in drainage projects Q 5.5 Area of forestry land in protected forests
Criterion 6	
Maintenance of other socio-economic and cultural functions and conditions <ul style="list-style-type: none"> • Forests in national and regional economy and employment aspects of forests, indicators 6.1-6.6 • Public participation in decision making, indicator 6.7 • Cultural and multiple-use of forests (recreational values), indicators 6.8-6.10 	D 6.1 Instruments for securing the operating conditions of the forest sector in the national and regional economy Q 6.2 The proportion of the forest sector of gross national product Q 6.3 Domestic and foreign trade of the forest sector Q 6.4 Labour and employment support in the forest sector

	Q	6.5	Small- and medium-sized enterprises in the forest sector by branch
	Q	6.6	Social factors of the forest workforce
	D	6.7	Instruments for securing and maintaining equitable opportunities for the public to participate in decision making
	D	6.8	Instruments to maintain the multiple use and cultural values of forests
	Q	6.9	Cultural values – archaeological monuments and landscape values
	Q	6.10	Recreational use of forests

Conclusions and Recommendations

In terms of its basic structure, the present revised list of Finnish national criteria and indicators for sustainable forest management corresponds to the first list prepared in 1997. Since the first list of criteria and indicators was drawn up, international discussion on the concept of sustainability has evolved, new research data on the different dimensions of sustainability have become available, and general interest in the sustainable management of forests has increased. For all these reasons, the present revised criteria and indicators differ somewhat from the previous list. The most significant changes are the development of the content of Criteria 4 and 6, and the change in the number of indicators considered.

After the Helsinki process (1993-95), the pan-European criteria and indicators were developed further for the Ministerial Conference on the Protection of Forests in Europe in Lisbon (1998) by defining the principles for their practical application. These principles set forth concrete targets for the implementation of 27 indicators. At the same time, special attention has been paid to the development of Criterion 4 (Maintenance, Conservation and Appropriate Enhancement of Biological Diversity in Forest Ecosystems) and Criterion 6 (Maintenance, Conservation and Appropriate Enhancement of Biological Diversity in Forest Ecosystems). Since the second Ministerial Conference in Helsinki in 1993, a significant amount of information and experience regarding those criteria has become available.

The goal of the revision of the Finnish national criteria and indicators was to adjust them so as to better serve the need for their practical application in forestry. The aim of the revision process was to focus on those indicators which best measure the achievement of sustainability in forestry and the changes in forest ecosystems. For this purpose, some indicators have been combined to make them more comprehensive, and some have been left out. The descriptive indicators have been merged into one single indicator for each criterion. Each new indicator embraces all the regulatory, economic, informational and institutional factors that affect sustainability. The present revised list of criteria and indicators contains a total of 47 individual indicators, whereas the previous list contained about 160 of them.

Collecting the data proved to be more demanding than expected. Some parameters that had proved to be effective indicators of sustainability were difficult to express in numerical terms, or there was no comprehensive statistical data available on them. Some parameters were successfully compiled thanks to the results of special studies. The new pricing principles adopted by Statistics Finland for the provision of statistical data and the lack of commensurate time series made it difficult to gather data for some indicators, and warranted some modification in the presentation of the results.

In order to develop the monitoring of sustainability in forestry into a transparent, continuous and efficient system, the efficiency of the systems for gathering data to measure sustainability must be improved. This will be one of the most challenging tasks in the process of developing the criteria and indicators in the future. The most important national sources of information in Finland are the National Forest Inventories, forest statistics, statistics on the national economy, and statistics on forest protection and environmental issues in forestry. The Finnish Forest Research Institute, the Forestry Development Centre Tapio, the Finnish Environment Institute, and the regional Forestry Centres and Environment Centres occupy a key position in developing the system for gathering data on sustainable forestry. Co-operation in the collecting of data needs to be increased, and the compilation of statistics must increasingly take into consideration aspects that can be used to measure the achievement of sustainability in forestry.

The present criteria and indicators can be used in reporting on the regional sustainability of forest management and as an aid to decision making. In the Pirkanmaa pilot project conducted in 1996-97, the criteria and indicators were applied for the first time to the development of regional forest programmes (regional forestry target programmes). Experiences from the project showed that there was insufficient information on the regional level, in particular on the multiple use of forests, their social significance, or the biological diversity of forest ecosystems. Therefore, data gathering on the regional level must be developed if the criteria and indicators are to become efficient tools for monitoring of regional forest programmes.

New, generally accepted criteria and indicators applicable to local conditions will be prepared in conjunction with the revision of regional forest programmes. Under the Forest Decree, the regional plans must be revised every five years at the most.

In the last three years, forest certification has gained prominence in international discussions on forests. The sustainable management of forests is promoted not only by the development of the criteria and indicators for sustainable forestry, but also by the development of forest certification. However, the approaches used in these two processes of development are different. The criteria and indicators are based on intergovernmental agreements, whereas forest certification represents voluntary activity by market actors. Forest certification is based on the criteria and indicators as well as on the forest and environmental legislation of each country, and supports their development.

The work on the national criteria and indicators in Finland has been in line with the results, conventions and recommendations of international and intergovernmental processes (UNCED, IPF/IFF, the pan-European Ministerial Conferences on Forest Protection). On the national level, the work has aimed at promoting transparency, consensus and the discussion of basic values.

When the criteria and indicators are next developed and updated, developments in general forest policy as well as international forest processes must be taken into consideration. Themes important for the process of developing the pan-European criteria and indicators include the social and cultural significance of forests, the profitability of forestry, rural development policy, and climate change. Another aspect which needs to be addressed is the relationship between the criteria and the practical principles for pan-European sustainable management of forests.

The process for the development of the criteria and indicators for sustainable forest management is an important regulatory instrument for forest policy, one which has both a national and a regional dimension. The criteria and indicators provide a tool for describing, in international contexts, sustainable forest management as it is practised in our country. Furthermore, they provide a constructive, Finnish perspective on the international debate on forests. As examples of application, they can contribute to the achievement of a wider consensus on the content of sustainable forest management globally.