RESOLUTION L2
Pan-European Criteria, Indicators and Operational Level Guidelines for Sustainable Forest Management

The Signatory States and the European Community,

A. Recalling the resolutions adopted at the Helsinki Ministerial Conference, namely in Resolution H1 "General Guidelines for the Sustainable Management of Forests in Europe" and Resolution H2 "General Guidelines for the Conservation of the Biodiversity of European Forests", and noting that pan-European criteria, indicators and operational level guidelines for sustainable forest management are based on Resolutions H1 and H2,

B. Acknowledging the co-operative work between the European countries and organisations in the formulation of criteria, describing the different aspects of sustainable forest management in Europe; through quantitative and descriptive indicators the development of a coherent set of tools to assess and assist further progress in sustainable forest management, at the international and national levels; and, guidelines for practical use on a voluntary basis at operational level,

C. Noting that criteria and indicators are potentially useful tools in promoting sustainable forest management by providing relevant information for forest policy development and evaluation, national forest policies, plans and programmes and as a basis for cross-sectoral forest related data collection,

D. Noting that the pan-European operational level guidelines, despite their voluntary nature, can contribute to improved communication, awareness building and implementation of appropriate action at the practical level for sustainable forest management when adapted to the specific conditions of the implementation level,

E. Aware of the need to refine and improve these pan-European tools as the concept of sustainable forest management evolves, technical and scientific knowledge improves and relevant international agreements are developed,

F. Recognising the effort made and progress achieved by European and other countries and international organisations to expand the development and use of criteria and indicators for sustainable forest management,

G. Acknowledging the contacts and co-operation with other international and regional processes and initiatives, as well as international organisations, for the development and implementation of criteria and indicators, and emphasising the importance to continue the co-operation to promote comparability among the various sets of criteria and indicators,

H. Acknowledging the collaboration with UN/ECE[1] and FAO[2], and particularly the support given in data collection by inclusion of most of the existing pan-European quantitative indicators in the temperate and boreal component of the Forest Resource Assessment (FRA) Programme.

have decided to:

1. Adopt the six criteria for sustainable forest management from the "Pan-European Criteria and Indicators for Sustainable Forest Management" (Annex 1) and endorse the associated indicators as a basis for international reporting and for development of national indicators;

2. Proceed to implement, continuously review and further improve the associated indicators;

3. Endorse the "Pan-European Operational Level Guidelines for Sustainable Forest Management" (Annex 2) as a framework of recommendations for sustainable forest management for practical use on a voluntary basis.

and commit themselves to:

1. Promote the development and implementation of national criteria and indicators using the Pan-European criteria and indicators as a reference framework, and taking into account specific country conditions and integrate them into national forest programmes or other relevant policy frameworks.

2. Improve the quality and promote the necessary adaptations of national data collection systems, to fulfil the needs of information for national and international reporting on sustainable forest management recognising the need for continuity of terms and definitions.

3. Use to the extent possible the criteria and indicators in international reporting on the status and conditions of European forests. Also call upon the UN/ECE, FAO and other

[1] UN/ECE: United Nations Economic Commission for Europe
[2] FAO: Food and Agriculture Organisation of the United Nations

relevant organisations to consider whether their regular international reporting, particularly the Forest Resource Assessment (FRA) Programme, could take into account the most updated criteria and indicators.

4. Encourage national and international research institutes to evaluate the consistency, relevance and cost effectiveness of indicators in assessing sustainable forest management, as well as availability of national data. Together with governments and organisations, identify needs, promote and support necessary co-operative research to improve and better assess the multiple functions and uses of forests which are considered as being insufficiently covered by the existing set of criteria and indicators.

5. Evaluate, at a national level, the development over time in measurable indicators with respect to the agreed developed objectives in order to assess progress made in sustainable forest management.

6. Engage efforts with other international and regional processes and initiatives, FAO, UNEP[3] and other relevant international organisations as well as conventions, to further elaborate common definition of key terms and concepts, as well as methodologies for data collection, storage and dissemination in order to enhance comparability of the different sets of criteria and indicators for sustainable forest management.

7. Encourage the adaptation of the “Pan-European Operational Level Guidelines for Sustainable Forest Management” to the specific national, sub-national and local economic, ecological, social and cultural conditions, with participation of the interested parties.

8. Disseminate the “Pan-European Operational Level Guidelines for Sustainable Forest Management” or equivalent existing national standards in line with the guidelines, to the forest owners, forest managers, forest organisations, general public, and other interested parties, and encourage their voluntary use.

Annexes:
(1) Pan-European Criteria and Indicators for Sustainable Forest Management
(2) Pan-European Operational Level Guidelines for Sustainable Forest Management

[3] UNEP: United Nations Environment Programme

ANNEX 1 OF THE RESOLUTION L2
Pan-European Criteria and Indicators for Sustainable Forest Management

Criteria and Quantitative Indicators were adopted at expert level by the First Expert Level Follow-Up Meeting of the Helsinki Conference, held in Geneva in June 24, 1994.

The Descriptive Indicators were adopted at expert level for possible use by the Second Expert Level Follow-Up Meeting of the Helsinki Conference, held in Antalaya in January 23, 1995.

CRITERION 1: Maintenance and Appropriate Enhancement of Forest Resources and their Contribution to Global Carbon Cycles

CONCEPT AREA: GENERAL CAPACITY

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides an overall policy framework for conservation and sustainable management of forests

2. Existence and capacity of an institutional framework to:
   - provide guidelines for national plans or programmes

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - permits the flow of capital in and out of the forest sector in response to market signals and public policy decisions

4. Existence of informational means to implement the policy framework, and the capacity to:
   - recognise the full range of forest values and potentials with periodic forest-related planning and assessment of national forest resources

CONCEPT AREA: LAND USE AND FOREST AREA

Quantitative indicator:

1.1. Area of forest and other wooded land and changes in area (classified, if appropriate, according to forest and vegetation type, ownership structure, age structure, origin of forest)

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - maintains forest resources and prevents forest degradation;
   - clarifies property rights and provides for appropriate land tenure arrangements

2. Existence and capacity of an institutional framework to:
   - carry out integration between land-use planning and forest management

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - supports mechanisms promoting integration between land-use planning and forest management planning

4. Existence of informational means to implement the policy framework, and the capacity to:
   - conduct and apply management guidelines for land-use planning in relation to forest resources
   - enhance conversion of agricultural and other treeless land to forest land by afforestation

CONCEPT AREA: GROWING STOCK

Quantitative indicator:

1.2. Changes in:

   a. total volume of the growing stock
   b. mean volume of the growing stock on forest land (classified, if appropriate, according to different vegetation zones or site classes)
   c. age structure or appropriate diameter distribution classes

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - supports sustainable management while increasing the growing stock of both merchantable and non-merchantable tree species on forest land available for timber production

2. Existence and capacity of an institutional framework to:
   - undertake and develop regular assessment of forest resources

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - provides appropriate incentives to support forest policy aiming at bigger growing stock

4. Existence of informational means to implement the policy framework, and the capacity to:
   - improve execution of forest resources assessment by acknowledged research institution or other similar organisations

CONCEPT AREA: CARBON BALANCE

Quantitative indicator:

1.3. Total carbon storage and, changes in the storage in forest stands

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - clarifies policies for enhancing the use of forest products for energy

2. Existence and capacity of an institutional framework to:
   - develop programmes for enhancing the use of forest products for energy

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - provides subventions for the use of wood for energy

4. Existence of informational means to implement the policy framework, and the capacity to:
   - enhance studies on the length of the life cycle of wood products
   - enhance effectively organised collection of waste paper

CRITERION 2: Maintenance of Forest Ecosystem Health and Vitality

Quantitative indicators:

2.1. Total amount of and, changes over the past 5 years in depositions of air pollutants (assessed in permanent plots)

2.2. Changes in serious defoliation of forests using the UN/ECE and EU defoliation classification (classes 2, 3, and 4) over the past 5 years

2.3. Serious damage caused by biotic or abiotic agents:

a. severe damage caused by insects and diseases with a measurement of seriousness of the damage as a function of (mortality or) loss of growth
b. annual area of burnt forest and other wooded land
c. annual area affected by storm damage and volume harvested from these areas
d. proportion of regeneration area seriously damaged by game and other animals or by grazing

2.4. Changes in nutrient balance and acidity over the past 10 years (pH and CEC); level of saturation of CEC on the plots of the European network or of an equivalent national network

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - enforces laws and policies related to maintaining forest health and vitality

2. Existence and capacity of an institutional framework to:
   - develop mechanisms for controlling the occurrence of serious damages / damage agents

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - creates appropriate incentives to prevent extreme disruption of ecological processes

4. Existence of informational means to implement the policy framework, and the capacity to:
   - strengthen regular field monitoring on forest health status and inventories of soil acidification
   - prevent serious damage caused by machinery and forestry operations: compaction of soil, injuries into standing trees, etc.

CRITERION 3: Maintenance and Encouragement of Productive Functions of Forests (wood and non-wood)

CONCEPT AREA: WOOD PRODUCTION

Quantitative indicators:

3.1. Balance between growth and removals of wood over the past 10 years

3.2. Percentage of forest area managed according to a management plan or management guidelines

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - encourages forest owners to practice environmentally sound forestry based on a forest management plan or equivalent guidelines

2. Existence and capacity of an institutional framework to:
   - develop institutions and mechanisms advocating economic, environmental and social factors as essential elements in wood production
   - develop and maintain efficient physical infrastructure to facilitate the delivery of forest products and services

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - supports investment and taxation policies which recognise the long-term nature of investments in forestry
   - supports non-discriminatory trade policies for forest products

4. Existence of informational means to implement the policy framework, and the capacity to:
   - improve technologies and plans based on proper forest inventories

CONCEPT AREA: NON-WOOD PRODUCTS

Quantitative indicator:

3.3. Total amount of and changes in the value and/or quantity of non-wood forest products (e.g., hunting and game, cork, berries, mushrooms, etc.)

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides legal instruments to regulate forest management practices for recreation and the harvesting of important non-wood forest products

2. Existence and capacity of an institutional framework to:
   - support appropriate organisations for extension services on non-wood benefits

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - enables the implementation of guidelines for management of non-wood benefits

4. Existence of informational means to implement the policy framework, and the capacity to:
   - develop management plans for non-wood benefits

CRITERION 4: Maintenance, Conservation and Appropriate Enhancement <u>of Biological Diversity</u> in Forest Ecosystems

CONCEPT AREA: <u>GENERAL CONDITIONS</u>

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - clarifies the concept of management, conservation and sustainable development of forest
   - provides for national adherence to international legal instruments

2. Existence and capacity of an institutional framework to:
   - maintain, conserve and appropriately enhance biological diversity at the ecosystem, species and genetic levels
   - identify economic value in forests whose management is adjusted in favour of maintaining biological diversity

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - creates new resources and incentives to enhance the mechanisms for predicting impacts of human interventions on forests
   - supports economic value in forests whose management is adjusted in favour of maintaining biological diversity

4. Existence of informational means to implement the policy framework, and the capacity to:
   - develop new inventories and ecological impact assessments on biological diversity
   - develop tools to assess the effects of forest management on biological diversity

CONCEPT AREA: REPRESENTATIVE, RARE AND VULNERABLE FOREST ECOSYSTEMS

Quantitative indicator:

4.1. Changes in the area of:

   a. natural and ancient seminatural forest types
   b. strictly protected forest reserves
   c. forests protected by special management regime

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides for legal instruments to protect representative, rare or vulnerable forest ecosystems

2. Existence and capacity of an institutional framework to:
   - develop and maintain institutional capacity and distribution of responsibilities related to protected areas
   - maintain degree of implementation of confirmed national forest conservation programmes

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - supports the representativeness of protected forests in relation to ecological and regional distribution

4. Existence of informational means to implement the policy framework, and the capacity to:
   - enhance measures to re-establish the endemic biological diversity in forests managed for production
   - apply measures for rehabilitation of degraded forest areas

CONCEPT AREA: THREATENED SPECIES

Quantitative indicator:

4.2. Changes in the number and percentage of threatened species in relation to total number of forest species (using reference lists e.g., IUCN, Council of Europe or the EU Habitat Directive)

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides for legal instruments to protect threatened species

2. Existence and capacity of an institutional framework to:
   - develop and maintain institutional instruments to protect threatened species

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - supports implementation of management guidelines to take into account threatened species

4. Existence of informational means to implement the policy framework, and the capacity to:
   - construct periodically reviewed lists of threatened forest species
   - enhance level of knowledge on threatened species / assessments, inventories or research on threatened species

CONCEPT AREA: BIOLOGICAL DIVERSITY IN PRODUCTION FORESTS

Quantitative indicators:

4.3. Changes in the proportions of stands managed for the conservation and utilisation of forest genetic resources (gene reserve forests, seed collection stands, etc.); differentiation between indigenous and introduced species

4.4. Changes in the proportions of mixed stands of 2-3 tree species

4.5. In relation to total area regenerated, proportions of annual area of natural regeneration

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides for legal instruments to ensure regeneration of managed forests

2. Existence and capacity of an institutional framework to:
   - develop and maintain institutional instruments to ensure regeneration of managed forests
   - conduct inventories on proportion of area covered by trees significantly older than the acceptable age of exploitation currently used

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - provides for economic incentives for taking account of environmental issues in management planning
   - conducts inventories / assessments on bioindicators

4. Existence of informational means to implement the policy framework, and the capacity to:
   - take measures to maintain or to re-establish biological diversity in old forests
   - monitor changes in the proportions of afforested or reforested areas covered by indigenous and introduced species, conifer and deciduous species

CRITERION 5: Maintenance and Appropriate Enhancement of Protective Functions in Forest Management (notably soil and water)

CONCEPT AREA: GENERAL PROTECTION

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides for legal instruments to regulate or limit forest management practices in forests protected for infrastructure / protection forests

2. Existence and capacity of an institutional framework to:
   - develop and maintain institutional instruments to regulate or limit forest management practices in forests protected for infrastructure / protection forests

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - supports the preparation of management guidelines for infrastructure and protection forests

4. Existence of informational means to implement the policy framework, and the capacity to:
   - conduct research on infrastructure and protection forests in relation to land use practices / forest management

CONCEPT AREA: SOIL EROSION

Quantitative indicator:

5.1. Proportion of forest area managed primarily for soil protection

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides for legal instruments to regulate or limit forest management practices in areas with vulnerable soils

2. Existence and capacity of an institutional framework to:
   - strengthen institutional instruments to regulate or limit forest management practices in areas with vulnerable soils

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - supports the preparation of management guidelines for areas with vulnerable soils

4. Existence of informational means to implement the policy framework, and the capacity to:
   - conduct inventories and research on soil erosion

CONCEPT AREA: WATER CONSERVATION IN FORESTS

Quantitative indicator:

5.2. Proportion of forest area managed primarily for water protection

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides for legal instruments to regulate or limit forest management practices in favour of water conservation or protection of water resources

2. Existence and capacity of an institutional framework to:
   - develop and maintain institutional instruments to regulate or limit forest management practices in favour of water conservation or protection of water resources

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - supports the preparation of management guidelines for taking into consideration water conservation in forest management practices

4. Existence of informational means to implement the policy framework, and the capacity to:
   - conduct inventories and research on water quality and flow characteristics in relation to land use practices / forest management

CRITERION 6: Maintenance of <u>other Socio-Economic Functions and Conditions</u>

CONCEPT AREA: <u>SIGNIFICANCE OF THE FOREST SECTOR</u>

Quantitative indicator:

6.1. Share of the forest sector from the gross national product

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides for legal instruments to ensure development of the forest sector

2. Existence and capacity of an institutional framework to:
   - develop and maintain efficient physical infrastructure to facilitate the supply of forest products

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - ensures new investments in the forest sector to meet future demands

4. Existence of informational means to implement the policy framework, and the capacity to:
   - develop and put into practice new improved technology
   - conduct market analysis to better fulfil the needs of society

CONCEPT AREA: <u>RECREATIONAL SERVICES</u>

Quantitative indicator:

6.2. Provision of recreation: area of forest with access per inhabitant, % of total forest area

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - recognises customary and traditional rights of indigenous people, and provides means of resolving access disputes

2. Existence and capacity of an institutional framework to:
   - undertake planning and assessment in recreational services on forestry

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - supports forestry constituencies to conserve special environmental, cultural, social and scientific values in relation to recreational services

4. Existence of informational means to implement the policy framework, and the capacity to:
   - conduct assessment on recreation

CONCEPT AREA: PROVISION OF EMPLOYMENT

Quantitative indicator:

6.3. Changes in the rate of employment in forestry, notably in rural areas (persons employed in forestry, logging, forest industry)

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides for legal instruments for securing income levels in forest sector

2. Existence and capacity of an institutional framework to:
   - develop and maintain human resource skills in all relevant tasks

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - supports programmes to ensure employment in rural areas in relation to forestry

4. Existence of informational means to implement the policy framework, and the capacity to:
   - secure a fair share of income from non-wood products coming from rural sources of income

CONCEPT AREA: RESEARCH AND PROFESSIONAL EDUCATION

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides for national programmes for research and professional education

2. Existence and capacity of an institutional framework to:
   - develop and maintain institutional instruments to enhance forest related research and education

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - provides public and private funding for research, educational and extension programmes

4. Existence of informational means to implement the policy framework, and the capacity to:
   - guarantee a sufficient number of people educated at different levels of forestry and cross-cutting field of education

CONCEPT AREA: PUBLIC AWARENESS

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides opportunities for public access to information

2. Existence and capacity of an institutional framework to:
   - strengthen organisations to provide extension services for general public

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - guarantees that part of forest revenues are reinvested in informing the public about forests

4. Existence of informational means to implement the policy framework, and the capacity to:
   - support teaching and informing of environmental issues and other forestry related subjects

CONCEPT AREA: PUBLIC PARTICIPATION

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides opportunities for public participation in public policy and decision making on forests

2. Existence and capacity of an institutional framework to:
   - enforce institutional mechanisms for the involvement of local people and NGOs in decision-making

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - attracts public outreach and preparatory planning

4. Existence of informational means to implement the policy framework, and the capacity to:
   - enhance public participation in decision-making processes related to implementation of forest policy

CONCEPT AREA: CULTURAL VALUES

Descriptive indicators (examples):

1. Existence of a legal / regulatory framework, and the extent to which it:
   - provides for programmes and management guidelines which recognise cultural heritage in relation to forestry

2. Existence and capacity of an institutional framework to:
   - develop and maintain programmes to conserve culturally valuable sites and landscapes

3. Existence of economic policy framework and financial instruments, and the extent to which it:
   - provides for sufficient financial incentives for acknowledgement of cultural values in forest management planning

4. Existence of informational means to implement the policy framework, and the capacity to:
   - conduct studies on proportion of culturally valuable sites and sites with special visual value

ANNEX 2 OF THE RESOLUTION L2
Pan-European Operational Level Guidelines for Sustainable Forest Management

The Operational Level Guidelines form a common framework of recommendations that can be used on a voluntary basis and as a complement to national and/or regional instruments to further promote sustainable forest management at the field level, on forest areas in Europe.

Adopted at the Fifth Expert Level Preparatory Meeting of the Lisbon Conference on the Protection of Forests in Europe, 27-29 April 1998, Geneva Switzerland.

1. INTRODUCTION

Forests in Europe grow in a wide and diverse range of ecological conditions, from boreal to Mediterranean and from alpine to lowlands. These forests have been influenced by human settlement and action over the centuries, and in some countries planted forests constitute a major part of the resource. Forest management in Europe is characterized by a large proportion of private, fragmented, small-scale farm-related ownership structures in the majority of countries, as well as a large proportion of public forests and forests owned by private forest enterprises in others.

Forest management takes place within clearly established ownership rights and with a long history of national/regional laws and regulations based on long-term planning. Thus, the concept of sustainability has a long tradition in forestry in Europe. However, the meaning of 'sustainable forest management' has developed over time according to the changing needs of society. Originally, sustainability in forest management was mainly considered as the sustained yield of timber to cope with historic wood shortages. However, the importance of other multiple functions of forests have gradually been incorporated in forest management. During the 1980's the concern about the deterioration of forests throughout Europe led to an increasing awareness of the economic, ecological, social and cultural values of forests by the

broader public. Nowadays many important aspects of sustainable forest management are covered by national and/or regional laws and regulations and are already being regularly monitored.

The wish for a concerted effort at a political level to protect and further improve the sustainable management of European forests led to the First Ministerial Conference on the Protection of Forests in Europe held in Strasbourg in 1990. At the Second Ministerial Conference, held in Helsinki in 1993, the ministers responsible for forestry in Europe embraced the internationally accepted UNCED[1] Forest Principles, taking a further step in the history of the concept of sustainable forest management by adopting, *inter alia*, Resolution H1 "General Guidelines for Sustainable Management of European Forests" and Resolution H2 "General Guidelines for the Conservation of the Biodiversity of European Forests". These General Guidelines represent the political commitment of the signatory states of the Helsinki Resolutions by providing a general policy direction and a long-term goal to meet the demands on European forests for multiple goods and services in a manner that is consistent with their sustainable management, and conservation and enhancement of their biological diversity.

A new, common definition of 'sustainable forest management' was laid down in Resolution H1:

> *'the 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'*

For the follow-up and the implementation of the General Guidelines, the pan-European national level criteria and indicators[2] were adopted at the expert level within the Follow-Up Process of the Helsinki Ministerial Conference in 1994. They are a policy instrument for evaluating and reporting progress towards sustainable forest management, as described in Resolution H1, in individual European countries and in Europe as a whole.

The six pan-European criteria for sustainable forest management are:

1. Maintenance and appropriate enhancement of forest resources and their contribution to global carbon cycles;
2. Maintenance of forest ecosystem health and vitality;
3. Maintenance and encouragement of productive functions of forests (wood and non-wood);

[1] United Nations Conference on Environment and Development, Rio de Janeiro, 1992.

[2] **Criteria** characterise or define the essential elements or set of conditions or processes by which sustainable forest management may be assessed. The direction of change within each criterion is shown by periodically measured **indicators**.

4. Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems;
5. Maintenance and appropriate enhancement of protective functions in forest management (notably soil and water); and
6. Maintenance of other socio-economic functions and conditions.

The Pan-European Operational Level Guidelines have been elaborated to further promote sustainable forest management in Europe by translating the international commitments down to the level of forest management planning and practices. They represent a common framework of recommendations for reference at the field level that can be used on a voluntary basis. These Guidelines are directly based on Resolutions H1 and H2, and they follow the structure of the six pan-European criteria that were identified as the core elements of sustainable forest management. For clarity they are divided into 'Guidelines for Forest Management Planning' and 'Guidelines for Forest Management Practices', focusing on basic ecological, economical and social requirements for sustainable forest management within each criterion.

The Pan-European Operational Level Guidelines are designed to be applied in the context of, and in full respect to, national and/or regional instruments and actions. They cannot be used in isolation to determine sustainability in forest management. Their purpose is to identify complementary actions at the operational level which will further contribute to sustainability of forest management. This should reflect national, economic, ecological, social and cultural conditions, research and traditional knowledge, and must respect forest and environmental legislation, decisions on protected areas, other general principles, as well as codes for forest practice such as standards used for forest management in any given country.

The effective implementation of these Guidelines implies recognizing the major role and the legal rights of forest owners. Furthermore, the implementation of sustainable forest management in the field requires continuous extension, training and education of forest managers, owners and workers, for which the Pan-European Operational Level Guidelines can provide an important reference.

2. POTENTIAL USES OF THE PAN-EUROPEAN OPERATIONAL LEVEL GUIDELINES

In general, the Pan-European Operational Level Guidelines are designed for sub-national applications at a practical level. Whenever used, their content should be adapted to the specific local, economic, ecological, social and cultural conditions, as well as to the respective forest management and administrational systems already in place; in this process participation of all interested parties should be encouraged. Therefore, all guidelines may not necessarily be relevant for all levels, all types of forest, or ownership categories.

In order to facilitate the implementation of these voluntary Guidelines, there might be a need for the promotion and equitable support by government, society and other beneficiaries to create and maintain a sound balance of interests including a sound economic basis for forestry.

The potential applications and users of the Pan-European Operational Level Guidelines are:

- **Forest managers and forest owners**

The Guidelines can assist forest managers and forest owners in planning and implementing improved sustainable management practices and operations in the field. They can be used for increasing communication and awareness in relation to the evolving concept of sustainable forest management and the desired actions at the operational level amongst forest owners, managers, employees, contractors or others.

- **Sub-national organisations**

The sub-national (regional or local) organisations can use the guidelines as a reference tool in informing and advising forest owners and forest managers, in planning the practices and/or in supervising their implementation. These types of organisations include, for example, sub-national administrational forestry organisations and forest owners or management associations.

- **National/governmental decision makers**

The Guidelines can be used as an internationally agreed framework for the guidance of forest management bringing the commitments made in the international policy *fora* (UNCED Forest Principles and Helsinki Resolutions) down to the field level. They can serve as a reference for setting codes for forest practice and forest management planning.

- **International forest dialogue**

The Guidelines form a European reference to the global forest dialogue. They can contribute, as an instrument representing consensus within the Pan-European Process, to the achievement of further consensus on sustainable management of all types of forests on a global scale.

- **Communication tools and certification systems**

These guidelines can serve as a tool to improve communication and awareness building related to sustainable forest management. In addition, although certification and other quality assurance systems or programmes as such would remain independent from the Pan-European Process and are voluntary to the interested parties, the Guidelines could provide an indicative reference for the establishment of standards for those systems.

3. PAN-EUROPEAN OPERATIONAL LEVEL GUIDELINES FOR SUSTAINABLE FOREST MANAGEMENT

CRITERION 1. Maintenance and appropriate enhancement of forest resources and their contribution to global carbon cycles

1.1 Guidelines for Forest Management Planning

a. Forest management planning should aim to maintain or increase forest and other wooded area, and enhance the quality of the economic, ecological, cultural and social values of forest resources, including soil and water. This should be done by making full use of related services such as land-use planning and nature conservation.

b. Inventory and mapping of forest resources should be established and maintained, adequate to the local and national conditions, and in correspondence with the topics described in these Guidelines.

c. Management plans or their equivalents, appropriate to the size and use of the forest area, should be elaborated and periodically updated. They should be based on legislation as well as existing land use plans, and adequately cover the forest resources.

d. Monitoring of the forest resources and evaluation of their management should be periodically performed, and their results should be fed back into the planning process.

1.2 Guidelines for Forest Management Practices

a. Forest management practices should safeguard the quantity and quality of the forest resources in the medium and long term by balancing harvesting and growth rates, and by preferring techniques that minimise direct or indirect damage to forest, soil or water resources.

b. Appropriate silvicultural measures should be taken to maintain the growing stock of resources at - or bring to - a level that is economically, ecologically and socially desirable.

c. Conversion of abandoned agricultural and treeless land into forest land should be taken into consideration, whenever it can add economic, ecological, social and/or cultural value.

CRITERION 2. Maintenance of forest ecosystem health and vitality

2.1 Guidelines for Forest Management Planning
a. Forest management planning should aim to maintain and increase the health and vitality of forest ecosystems and to rehabilitate degraded forest ecosystems, whenever this is possible by silvicultural means.
b. Health and vitality of forests should be periodically monitored, especially key biotic and abiotic factors that potentially affect health and vitality of forest ecosystems, such as pests, diseases, overgrazing and overstocking, fire, and damage caused by climatic factors, air pollutants or by forest management operations.
c. Forest management plans or their equivalents should specify ways and means to minimise the risk of degradation of and damages to forest ecosystems. Forest management planning should make use of those policy instruments set up to support these activities.
2.2 Guidelines for Forest Management Practices
a. Forest management practices should make best use of natural structures and processes and use preventive biological measures wherever and as far as economically feasible to maintain and enhance the health and vitality of forests. Adequate genetic, species and structural diversity should be encouraged and/or maintained to enhance stability, vitality and resistance capacity of the forests to adverse environmental factors and strengthen natural regulation mechanisms.
b. Appropriate forest management practices such as reforestation and afforestation with tree species and provenances that are suited to the site conditions or the use of tending, harvesting and transport techniques that minimise tree and/or soil damages should be applied. The spillage of oil through forest management operations or the indiscriminate disposal of waste on forest land should be strictly avoided.
c. The use of pesticides and herbicides should be minimised, taking into account appropriate silvicultural alternatives and other biological measures.
d. In case fertilisers are used they should be applied in a controlled manner and with due consideration to the environment.

CRITERION 3. Maintenance and encouragement of productive functions of forests (wood and non-wood)

3.1 Guidelines for Forest Management Planning
a. Forest management planning should aim to maintain the capability of forests to produce a range of wood and non-wood forest products and services on a sustainable basis.
b. Forest management planning should aim to achieve sound economic performance taking into account possibilities for new markets and economic activities in connection with all relevant goods and services of forests.
c. Forest management plans or their equivalents should take into account the different uses or functions of the managed forest area. Forest management planning should make use of those policy instruments set up to support the production of merchantable and non-merchantable forest goods and services.
3.2 Guidelines for Forest Management Practices
a. Forest management practices should be ensured in quality with a view to maintain and improve the forest resources and to encourage a diversified output of goods and services over the long term.
b. Regeneration, tending and harvesting operations should be carried out in time, and in a way that do not reduce the productive capacity of the site, for example by avoiding damage to retained stands and trees as well as to the forest soil, and by using appropriate systems.
c. Harvesting levels of both wood and non-wood forest products should not exceed a rate that can be sustained in the long term, and optimum use should be made of the harvested forest products, with due regard to nutrient offtake.
d. Adequate infrastructure, such as roads, skid tracks or bridges should be planned, established and maintained to ensure efficient delivery of goods and services while at the same time minimising negative impacts on the environment.

CRITERION 4. Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems

4.1 Guidelines for Forest Management Planning

a. Forest management planning should aim to maintain, conserve and enhance biodiversity on ecosystem, species and genetic level and, where appropriate, diversity at landscape level.

b. Forest management planning and terrestrial inventory and mapping of forest resources should include ecologically important forest biotopes, taking into account protected, rare, sensitive or representative forest ecosystems such as riparian areas and wetland biotopes, areas containing endemic species and habitats of threatened species, as defined in recognised reference lists, as well as endangered or protected genetic *in situ* resources.

4.2 Guidelines for Forest Management Practices

a. Natural regeneration should be preferred, provided that the conditions are adequate to ensure the quantity and quality of the forests resources and that the existing provenance is of sufficient quality for the site.

b. For reforestation and afforestation, origins of native species and local provenances that are well adapted to site conditions should be preferred, where appropriate. Only those introduced species, provenances or varieties should be used whose impacts on the ecosystem and on the genetic integrity of native species and local provenances have been evaluated, and if negative impacts can be avoided or minimised.

c. Forest management practices should, where appropriate, promote a diversity of both horizontal and vertical structures such as uneven-aged stands and the diversity of species such as mixed stands. Where appropriate, the practices should also aim to maintain and restore landscape diversity.

d. Traditional management systems that have created valuable ecosystems, such as coppice, on appropriate sites should be supported, when economically feasible.

e. Tending and harvesting operations should be conducted in a way that do not cause lasting damage to ecosystems. Wherever possible, practical measures should be taken to improve or maintain biological diversity.

f. Infrastructure should be planned and constructed in a way that minimises damage to ecosystems, especially to rare, sensitive or representative ecosystems and genetic reserves, and that takes threatened or other key species - in particular their migration patterns - into consideration.

g. With due regard to management objectives, measures should be taken to balance the pressure of animal populations and grazing on forest regeneration and growth as well as on biodiversity.

h. Standing and fallen dead wood, hollow trees, old groves and special rare tree species should be left in quantities and distribution necessary to safeguard biological diversity, taking into account the potential effect on health and stability of forests and on surrounding ecosystems.

i. Special key biotopes in the forest such as water sources, wetlands, rocky outcrops and ravines should be protected or, where appropriate, restored when damaged by forest practices.

CRITERION 5. Maintenance and appropriate enhancement of protective functions in forest management (notably soil and water)

5.1 Guidelines for Forest Management Planning
a. Forest management planning should aim to maintain and enhance protective functions of forests for society, such as protection of infrastructure, protection from soil erosion, protection of water resources and from adverse impacts of water such as floods or avalanches. b. Areas that fulfil specific and recognised protective functions for society should be registered and mapped, and forest management plans or their equivalents should take full account of these areas.
5.2 Guidelines for Forest Management Practices
a. Special care should be given to silvicultural operations on sensitive soils and erosion-prone areas as well as on areas where operations might lead to excessive erosion of soil into watercourses. Inappropriate techniques such as deep soil tillage and use of unsuitable machinery should be avoided on such areas. Special measures to minimise the pressure of animal population on forests should be taken. b. Special care should be given to forest management practices on forest areas with water protection function to avoid adverse effects on the quality and quantity of water resources. Inappropriate use of chemicals or other harmful substances or inappropriate silvicultural practices influencing water quality in a harmful way should be avoided. c. Construction of roads, bridges and other infrastructure should be carried out in a manner that minimises bare soil exposure, avoids the introduction of soil into watercourses and that preserve the natural level and function of water courses and river beds. Proper road drainage facilities should be installed and maintained.

CRITERION 6. Maintenance of other socio-economic functions and conditions

6.1 Guidelines for Forest Management Planning

a. Forest management planning should aim to respect the multiple functions of forests to society, have due regard to the role of forestry in rural development, and especially consider new opportunities for employment in connection with the socio-economic functions of forests.

b. Property rights and land tenure arrangements should be clearly defined, documented and established for the relevant forest area. Likewise, legal, customary and traditional rights related to the forest land should be clarified, recognised and respected.

c. Adequate public access to forests for the purpose of recreation should be provided taking into account the respect for ownership rights and the rights of others, the effects on forest resources and ecosystems, as well as the compatibility with other functions of the forest.

d. Sites with recognised specific historical, cultural or spiritual significance should be protected or managed in a way that takes due regard of the significance of the site.

e. Forest managers, contractors, employees and forest owners should be provided with sufficient information and encouraged to keep up to date through continuous training in relation to sustainable forest management.

6.2 Guidelines for Forest Management Practices

a. Forest management practices should make the best use of local forest related experience and knowledge, such as of local communities, forest owners, NGOs and local people.

b. Working conditions should be safe, and guidance and training in safe working practice should be provided.

c. Forest management operations should take into account all socio-economic functions, especially the recreational function and aesthetic values of forests by maintaining for example varied forest structures, and by encouraging attractive trees, groves and other features such as colours, flowers and fruits. This should be done, however, in a way and to an extent that does not lead to serious negative effects on forest resources, and forest land.