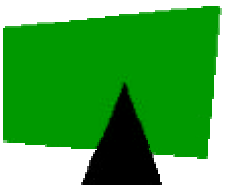

RESOLUTION S1
European Network of Permanent Sample Plots for Monitoring of Forest Ecosystems

The Signatory States and International Institution,

considering that forests in Europe make up an ecological, cultural and economic heritage that is essential to our civilization,

considering that studies of the health problems of forests in the last decade:

- have shown that some forest ecosystems are in a precarious state due to various factors, notably air pollution and certain meteorological events,

- have made clear the need for and the great scarcity of reliable data on these ecosystems, particularly for the period preceding the reported incidents,

- have, notably under the auspices of the United Nations Economic Commission for Europe (Convention on Long-Range Transboundary Air Pollution, Geneva, 1979), given rise to important and fruitful work, which has led to the finalizing of jointly-agreed methods for assessing pollution and the state of forests,

considering that, apart from the continuing impact of air pollution, it is to be feared that further pressures are likely, such as climatic changes arising from the greenhouse effect, or others as yet totally unforeseen,

considering that it is important to draw the right conclusions from the experience and knowledge acquired in the field of forest management methods that encourage the vitality of forest ecosystems,

considering that it is necessary to detect as soon as possible every significant change in the functioning of forest ecosystems, and to be able to define their characteristics and analyse their causes swiftly,

considering that it is necessary to determine whether the changes observed to date can be interpreted as falling within the fluctuations around a stable average observed in the recent past,

considering that it is necessary to know the critical levels and critical loads of pollution liable to bring about the destabilization of different forest ecosystems,

considering that the significant effort already made to better understand the evolution of forest ecosystems, often characterized by their fragile nature, should lead to an advance in the resolution of serious problems identified by monitoring,

will endeavour to put in their respective countries the recommendations concerning assessment and monitoring put forward by the International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests.

THE PRINCIPLES

1. The efforts already made to monitor the state of forest ecosystems, within the framework of the various regional, national or international programmes, must be reinforced. Most of these programmes were originally set up to gather the information required for an ecologically responsible management of timber production. At the beginning of the eighties, the concern felt at the damage caused to forests by air pollution led to important international actions, notably in the context of the various study groups set up under the auspices of the Convention on Long-Range Transboundary Air Pollution. With the opening of the nineties, general awareness of the fragility of many European forest ecosystems justifies the continuation and strengthening of initiatives already undertaken.

2. The strengthening of present efforts in monitoring forest ecosystems aims at improving the ways of managing timber production in an ecologically-responsible fashion, and also at adopting the means needed for an effective environmental protection policy. These aims require:

    2.1. the availability of a permanent mechanism for the gathering of objective and, wherever possible, comparable data, that will allow a better diagnosis and analysis of existing and future problems in all their geographical and temporal variability,

    2.2. an evaluation of the quantitative development of factors that affect the functioning of forest ecosystems and timber production, as well as the reactions of these ecosystems to air pollution, stress, climatic fluctuations, storms, fires, human interventions, etc...

2.3. the adoption of permanent arrangements by which progress may be made in determining relations between cause and effect, for example, by characterizing for a given ecosystem the local pollution level and the critical threshold of pollutants responsible for the ecosystem's destabilization.

3. The monitoring of forest ecosystems should rely simultaneously on two levels of permanent sample plots:

- sample plots for elementary systematic monitoring
- sample plots for intensive monitoring

3.1. The sample plots for elementary systematic monitoring are positioned on the intersection points of systematic inventory grids, with a density at least equal to that recommended by the International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests. This type of systematic network allows regional assessments and statistical research to be carried out, thus providing the data needed for forestry and environmental policy. It also permits the orientation of observations and measurements on to the intensive monitoring sample plots.

3.2. The intensive monitoring sample plots are installed in order to obtain detailed data on the evolution of a number of forest ecosystems in Europe. This type of approach allows correlations to be established between the variation of environmental factors and the reactions of ecosystems, or, for example, allows us to determine the critical level of pollutants likely to destabilize one type of ecosystem. The data it provides allows a better interpretation of the findings derived from the systematic network.

4. The need for a better grasp of the geographical and temporal variability of the parameters measured and the problems studied, in order to be able to give more precision to a responsible policy for the forest and the environment, justifies a reinforcement of the effort to harmonize the monitoring methods for forest ecosystems and to analyse the data obtained. The comparability of data on the European scale must be developed.

5. The necessity of taking into account the historical dimension of the evolution and variation in forest health, site conditions and climatic events justifies a larger and coordinated effort to describe such fluctuations in the past.

6. Priority must be given to the coherent long-term tracking of the data already gathered within the existing systems, as well as to complementing this data with new measurements, which can contribute as rapidly as possible to the thinking and decisions of national and international authorities.

7. The HAMBURG and PRAGUE coordination centres, set up within the framework of the technical programmes linked to the Convention on Long-Range Transboundary Air Pollution, should intensify the international coordination of these networks, as well as the

work of synthesis and interpretation of the data on the scale of large ecological regions or large types of forest ecosystems in Europe, thanks to the funding guaranteed by all the member countries. To this end, minimum batches of data, gathered in a standardized form to be determined later, are transmitted to the centres.

THE JOINT PROJECT

1. The network of elementary systematic monitoring takes into account the estimation or measurements of some simple parameters concerning ecological site conditions and tree vitality. The inventories currently carried out will have to be progressively completed along these lines, following the recommendations of the International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests.

2. The intensive monitoring sample plots are designed for more numerous and finer estimations and measurements, describing the stand and its history, the trees and their foliage, the vegetation, the soil, the climate, and, in a certain number of cases, the chemical composition of open-space rain, intercepted rain, and drainage water. As far as it is possible, some of these sample plots should be installed on-site or in the immediate vicinity of stations for measuring atmospheric pollution.

3. The special team of the International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests must draw up the minimum list of the parameters pertaining to the sample plots of the elementary systematic monitoring and the intensive monitoring, as well as the recommended methods of analysis.

NATIONAL AND INTERNATIONAL COORDINATION BODIES

1. All the countries taking part in the International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests are invited to participate in this project and to gather data which will be forwarded to the HAMBURG and PRAGUE coordination centres.

2. All the European countries concerned by the danger of the destabilization of forest ecosystems feel the need for reinforced international action, to make the permanent monitoring of these ecosystems even more effective and, in a more coordinated manner, to make better use of the experience already gained by many countries or through international programmes that are already set up, such as the International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests and the other relevant programmes of the Economic Commission for Europe of the United Nations within the framework of the Convention on Long-Range Transboundery Air Pollution (Geneva, 1979), the FAO/ECE 1990 inventory of forestry resources, the EEC's action for the protection of forests against air pollution and in particular its inventory of damage to forests, and the joint research programmes of the Nordic Council of

Ministers. The exchanging of information and the coordination of projects must be encouraged and reinforced.

3. The HAMBURG and PRAGUE coordination centres, set up within the framework of the Convention on Long-Range Transboundary Air Pollution (Geneva, 1979) should have the responsibility of collecting a certain amount of data produced by the elementary systematic network as well as the intensive monitoring network, and for presiding over the management, utilization, synthesis and interpretation of the data provided. The list of data to be transmitted to the coordination centres will be set out in the proposals made by the special teams of the International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests. Each member state of the network contributes to the cost of these centres.