

## Healthy and Productive Forests Mitigate Climate Change

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Forests cover around one third of Europe's surface. They provide a multitude of economic and social functions and play a major role in nature conservation and environmental protection.

The COST Strategic workshop on the role of "Forest Ecosystems in a Changing Environment" brought together nearly 180 scientists from around 30 countries in Istanbul, Turkey, to identify future monitoring and research needs and to provide recommendations on forest ecosystem monitoring and research in Europe. [IUFRO Research Group 7.01.00](#) co-sponsored the event.

The workshop specifically tackled the fields of climate change and forests, ozone, atmospheric deposition and critical loads, biodiversity, as well as quality assurance in forest monitoring. Experts agreed that increased and joint efforts are necessary to understand combined climate change and air pollution effects on forests and to develop strategies for mitigation and adaptation.

**Biological effects of climate change need to be studied in more detail.** Increased support is necessary to study the biological response of forest ecosystems to climate change, including annual tree growth, mortality and its causes, tree condition, phenology, regeneration, and species composition. In addition, water budget models and techniques for interpolating meteorological data need to be further developed, harmonised and applied on a larger number of monitoring and research sites.

**Ozone risk assessment has to be improved.** It needs to be ensured that ozone impacts on vegetation are on the future agenda both in research and monitoring as well as in the field of clean air policies. This is urgently necessary, because ground level ozone can be directly toxic for humans, plants, and animals. In addition, it is one of the most important greenhouse gases. Future risk assessment needs to be based on the ozone flux into the plants rather than solely on the ambient ozone concentrations.

**A much more integrated view on different atmospheric pollutants is necessary.** Instead of focussing on single pol-



Photo: Eddy-correlation tower for measuring canopy-level ozone flux in a Mediterranean forest (provided by IUFRO RG 7.01.00)

lutants, support is needed for research activities, teasing out combined effects of pollutants and their interactions in the atmosphere and within the forest ecosystems. Dynamic modelling needs to be further developed to assess combined effects of air pollution and climate change on soils and vegetation. Effects of nitrogen deposition on carbon sequestration and on biological diversity need to remain on the monitoring and research agenda.

**A multifunctional European forest monitoring system needs to be sustained and further developed.**

The scientists agreed that the monitoring data collected under the

UNECE Convention on Long-range Trans-boundary Air Pollution and the EU are today one of the most important bases for evaluating results of environmental policy and to predict future responses of forests to climate change. Therefore, forest monitoring needs continuous financial and political support by the responsible authorities. At the same time it needs to be ensured that existing long-term monitoring is further developed and adapted specifically in the fields of climate change and biodiversity. A detailed programme for quality assurance needs to be further developed and implemented within the monitoring programme to ensure high quality data. Research programmes need to take much more benefit from the existing long term monitoring data. Scientists claimed that access to these data needs to be considerably simplified.

**Basic research, forest monitoring and modelling urgently need to be linked and integrated.**

The workshop provided excellent opportunities to establish links between basic research, forest monitoring and modelling. Such links need to be supported and intensified in the future because basic understanding of ecosystem processes, data provision as well as data extrapolation and evaluation rely on each other. The creation of well distributed core sites with a still larger number of parameters measured was recommended. These sites should ideally build on existing monitoring plots which need to be upgraded for intensified research and model development. Research and monitoring programmes should jointly

The COST Strategic Workshop took place from 11 to 13 March in Istanbul, Turkey with COST Support. It was organized by the Institute for World Forestry ([www.worldforestry.de](http://www.worldforestry.de)) in Hamburg, the Turkish Ministry of Environment and Forestry ([www.ogm.gov.tr](http://www.ogm.gov.tr)), the International Union of Forest Research Organizations ([www.iufro.org](http://www.iufro.org)), the Joint Research Centre of the European Commission (<http://forest.jrc.it>) and the European Environment Agency ([www.eea.eu.int](http://www.eea.eu.int)).

More information: <http://www.cost.esf.org/events> or <http://www.costforest2008.org>