ICP FORESTS
BRIEF #1
2018

LRTAP
Long-range Transboundary Air Pollution

ICP Forests

A policy-relevant infrastructure for long-term, large-scale assessment and monitoring of forest ecosystems

KEY MESSAGES

1

ICP Forests is a transnational forest monitoring and research network established under the UNECE Air Convention in 1985. 42 countries are currently cooperating under ICP Forests

2

Quantitative policy-relevant information on air pollution effects on forests is collected via systematic large-scale monitoring (Level I) and intensive monitoring at permanent, highly instrumented plots (Level II)

3

Transnational harmonisation and standardisation of data collection and evaluation makes ICP Forests unique in the global forest monitoring landscape

4

Data collected by ICP Forests are stored in a central database and are available on request to scientists across the world for research purposes

THÜNEN

wge Working Group on Effects of the Convention on Long-range Transboundary Air Pollution

ICP Forests

Transnational forest monitoring and research under the UNECE

The International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests) is a transnational forest monitoring and research network under the United Nations Economic Commission for Europe (UNECE) Convention on Long-range Transboundary Air Pollution (Air Convention, formerly LRTAP Convention or CLRTAP). Information on the status and trends of forest ecosystems and their responses to environmental change in Europe and beyond have been collected under ICP Forests for over 30 years. At present, 42 countries are cooperating within the ICP Forests programme.

This is the first of the new ICP Forests Briefs, which aim to provide clear and concise information on the ICP Forests monitoring programme and its latest scientific findings. These short updates are primarily directed at policymakers and the interested public offering them scientific knowledge for an informed debate on key forest-related environmental topics.

The Air Convention — the first international treaty to address air pollution on a broad regional basis

Air pollution is a global concern that is increasing in many regions of the world as the energy, agricultural, industrial, and traffic sectors continue to grow. It was first recognised as a transnational issue in the late 1960s, when large-scale acidification of surface waters in Scandinavia could be clearly connected to long-range transboundary air pollution.

The establishment of the Air Convention in 1979 was the first legally binding international agreement aiming to control air pollution in Europe and beyond. It functions within the UNECE, whose members include all the countries of Europe, the Caucasus and Central Asia, as well as the USA and Canada.

The Air Convention provides a general framework for collaboration to limit, gradually reduce and ultimately prevent air pollution. Initially aimed at reducing the effects of 'acid rain' through control of sulphur emissions, the scope of the Convention was later widened to include nitrogen pollutants, volatile organic compounds (VOCs), heavy metals, and persistent organic pollutants (POPs).

ICP Forests — Monitoring the effects of air pollution, climate change, and other stressors on forest ecosystems

ICP Forests operates under the UNECE Air Convention and was established as part of the Working Group on Effects (WGE) in 1985. This was in response to wide public and political concern about the extensive forest damage observed in Central Europe that was attributed to air pollution. Since then the focus of ICP Forests has widened from solely studying the impact of air pollution on forest ecosystems to include the study of other forest-related issues such as climate change effects, carbon sequestration, ecosystem services and biodiversity. Over the past few years, ICP Forests has received more than 130 data requests from scientists working in these fields.

ICP Forests monitoring: variables and frequency.
Not every survey is conducted on all plots.

Survey	Level I sites	Level II sites	Frequency
Air quality		×	Continuously
Biodiversity		×	Every 5 yrs
Crown condition	×	×	Every year
Deposition		×	Weekly/monthly
Foliar analysis	×		Every 10-15 yrs
		×	Every 2 yrs
Ground vegetation		×	Every 5 yrs
Growth		×	Every 5 yrs
Leaf area index (LAI)		×	At least every 2 yrs
Litterfall		×	Continuously
Meterology		×	Continuously
Ozone injury		×	Every year
Phenology		×	Several times per year
Soil	×	×	Every 10-15 yrs
Soil Solution		×	Continuously

As well as addressing the scientific information needs of the Air Convention, thereby underpinning the advancement of air pollution abatement measures in Europe, the quantitative policy-relevant information on air pollution effects on forests collected by ICP Forests can also be used by other national and international forest and environmental bodies, such as Forest Europe (FE, formerly the Ministerial Conference for Protection of Forests in Europe – MCPFE), the Convention on Biological Diversity (CBD), and the United Nations Framework Convention on Climate Change (UNFCCC).

Monitoring at two levels of intensity

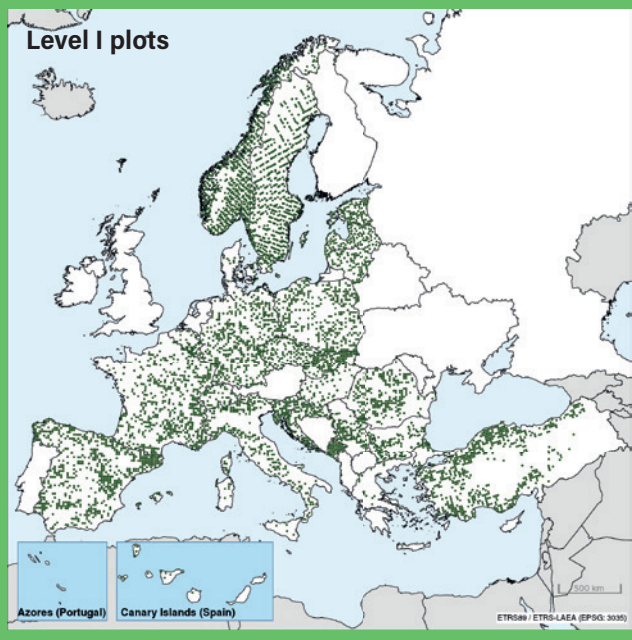
Systematic large-scale monitoring (Level I) provides periodic overviews of the spatial and temporal variation in forest health, forest soil condition, and leaf chemistry in relation to anthropogenic and natural stressors. Monitoring at Level I plots began in 1986.

Intensive monitoring (Level II) is undertaken on a network of permanent, highly instrumented forest monitoring plots. Level II monitoring aims to foster integrative studies on cause-effect relationships of anthropogenic and natural stressors with forest condition and forest processes. Such plots generate consistent and standardised long-term data series for many ecosystem compartments and processes. More than 250 variables are collected on Level II plots. Monitoring at Level II plots began in 1994.

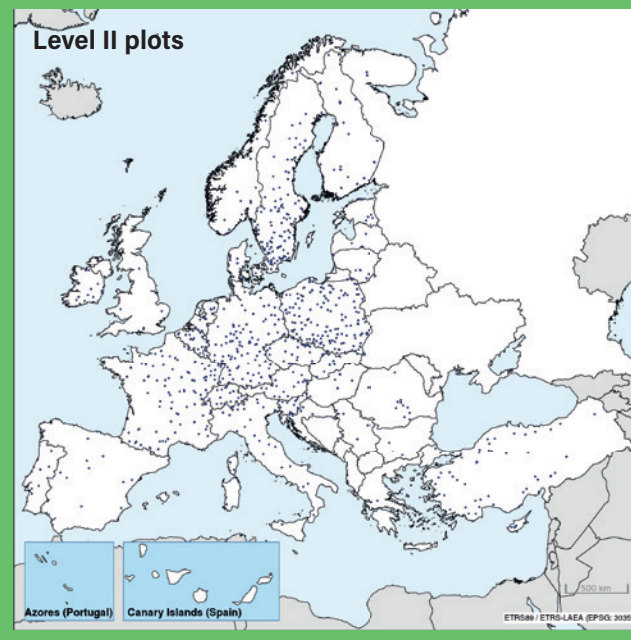
Standardised methodology ensures high data quality

An outstanding feature of the ICP Forests programme is the implementation of a standardised approach for data collection and evaluation at every Level I and Level II plot across the entire network – in every member state and in every survey, as well as additional measures for quality control and assurance. This includes field checks, inter-calibration and cross-comparison courses, inter-laboratory ring tests, data validation procedures and internal reviewing. The transnational standardisation of methodology makes ICP Forests unique within the global forest monitoring landscape.

All surveys and methods are described in the ICP Forests Manual (see 'Suggested reading') which has been developed over a period of 30 years. This Manual also summarises the respective scientific background for the Level I and Level II networks and for each of the surveys.

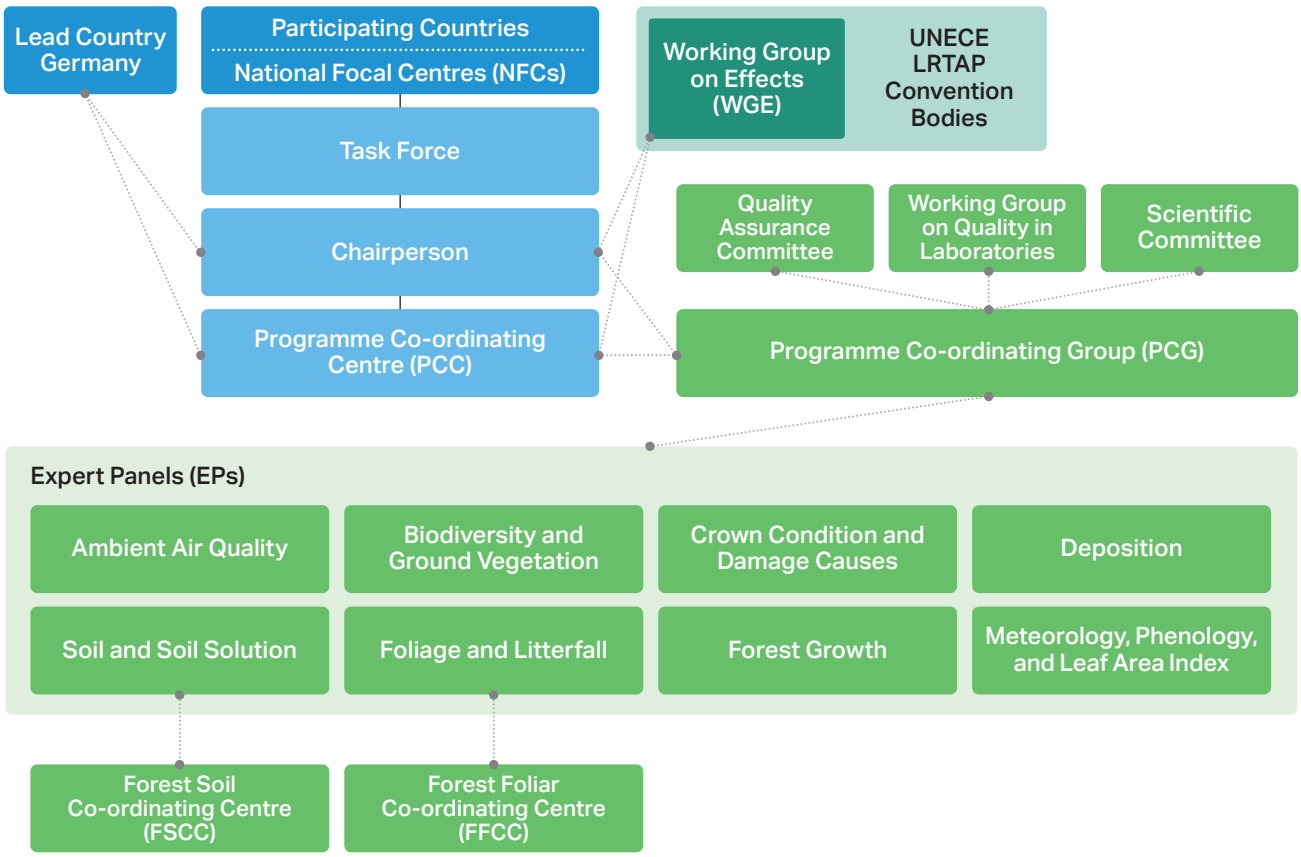


Distribution of Level I plots in 2016. Around 5000 plots are currently active



Distribution of Level II plots temporarily active between 2000 and 2016. Around 600 plots are currently active

Organisational structure for ICP Forests



Data available upon request

The large range of data collected by ICP Forests is stored in a central database and managed according to an agreed data policy. Data are available for internal and external use upon request and ICP Forests invites scientists from all over the world to use ICP Forests data for research purposes.

Detailed information on the ICP Forests programme, its structure, participants, publications, and data availability is available at http://icp-forests.net

Suggested reading

Ferretti M, Fischer R (eds), 2013: Forest Monitoring: Methods for terrestrial investigations in Europe with an overview of North America and Asia. Developments in Environmental Science, Vol. 12. Elsevier.

ICP Forests, 2016: Manual on Methods and Criteria for Harmonized Sampling, Assessment, Monitoring and Analysis of the Effects of Air Pollution on Forests. Thünen Institute of Forest Ecosystems, Eberswalde.

UNECE, 2009: Clearing the Air. 30th Anniversary of the Convention on Long-range Transboundary Air Pollution. United Nations Economic Commission for Europe (UNECE), Geneva.

United Nations Economic Commission for Europe (UNECE) Convention on Long-range Transboundary Air Pollution (Air Convention) International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests)

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