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# Forest Condition in Europe

## The 2023 Assessment

ICP Forests Technical Report under the UNECE Convention  
on Long-range Transboundary Air Pollution (Air Convention)

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on Long-range Transboundary Air Pollution (Air Convention)

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Convention on Long-range Transboundary Air Pollution (Air Convention)  
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# ICP FORESTS MEMBER STATES' VIEW ON THE CURRENT ICP FORESTS STRATEGY AND FUTURE ACTIVITIES

*Kai Schwärzel, Anne-Katrin Prescher*

## Background and aims of the questionnaire

The current ICP Forest Strategy was adopted at the 32nd Task Force meeting in 2016, and expires at the end of 2023. Therefore, at the meeting of the Programme Co-ordinating Group (PCG) in November 2022, a working group was formed to develop a new strategy for the period 2024 to 2030. At this meeting, it was decided to ask the member states' views on the strategy by means of a questionnaire. The aim was, on the one hand, to get to know the views of the ICP Forests member states on the strategy currently in force and, on the other hand, to take account of the partners' ideas in the development of the new strategy.

The questionnaire consisted of 24 questions, divided into questions on the relevance and validity of the current strategy, on the priorities of the member countries in relation to forest environmental monitoring, and on the countries' views on the future of program-related monitoring activities.

## ICP Forests member states' view on the current strategy

22 out of currently 31 active member states of ICP Forests have completed the questionnaire and two other countries have partially answered it. 88% of the member states participating in the survey are familiar with the current strategy, and all countries that participated in the survey agree or strongly agree with the objectives of the current ICP Forestry Strategy listed below:

- **Forest condition.** Provide a continued overview on forest health, vitality, forest soil condition and biodiversity status in relation to anthropogenic (air pollution, atmospheric deposition, climate change) and natural stressors.
- **Cause-effect relationships.** Contribute to a better understanding of cause-effect relationships between anthropogenic as well as natural stressors and forest condition and processes.
- **High quality data.** Provide high quality and open access data managed in one central database for risk assessment

for forests across Europe, large-scale and long-term trend analyses as well as model validation and calibration, serving also as a reference for global assessments.

- **Research Infrastructure.** Develop and maintain highly equipped forest measurement stations as central data hubs and standardized forest monitoring and research infrastructures (RI) across Europe.

We then asked whether the objectives and actions listed in the current strategies for achieving the ICP Forests vision are still valid. For this purpose, we defined different priority levels and asked the member states to answer this question from a national perspective and from an international perspective. Table 1 summarizes the member states' responses separately for national and international priorities. This table shows that the objectives and measures of the current strategy remain an essential or high priority for member states at the international level. With some exceptions, this is also true when member states look at objections and activities from a national perspective. The exceptions are objectives and activities that are more relevant to the program at the international level, such as "Stress the global importance of air pollution monitoring by closer co-operation with networks outside Europe" or "Follow-up on relevant international policy issues and offer collaborations". Of course, this plays a lesser role at the national level and therefore the priority from a national perspective is much lower than from an international perspective.

Another issue in evaluating the ICP Forests Strategy currently in place was whether goals or actions were missing. This question was denied by 81% of the member states participating in the survey. However, it was noted that the strategy highlights air pollution, but changes in climate and biodiversity should play a more visible role. Other comments were that ICP Forests should increase the visibility of ICP Forests methods and data to encourage collaboration with other networks, or that linking remote sensing technologies and ICP Forests data would be desirable.

**Table 8-1: Priorities of objectives and measures of the current strategy from the perspective of member states, separated into international and national (in brackets) perspectives.**

Objectives and actions	Priority		
	No answer No or low priority	Neutral	Essential / high
Intensify coordination of the national monitoring activities by offering standardized infrastructure to potential users	4% (4%)	12% (27%)	84% (69%)
Broaden the scope of monitoring	4% (4%)	12% (12%)	84% (84%)
Follow-up on relevant international policy issues and offer collaborations	0% (0%)	0% (31%)	100% (69%)
Strive for long-term financing of activities	0% (4%)	4% (12%)	96% (84%)
Increase the visibility of ICPF	0% (0%)	8% (12%)	92% (88%)
Foster a high quality and transparent database	0% (0%)	4% (8%)	96% (92%)
Strive towards maintaining used field measurement methods at the latest state of the art to guarantee for high quality data	0% (4%)	8% (19%)	92% (77%)
Explore new tools and technologies	4% (12%)	31% (31%)	66% (57%)
Use monitoring data for testing cause-effect relationships, long-term trend analyses, modelling	0% (0%)	8% (15%)	92% (85%)
Enhance cooperation with sister ICPs	4% (15%)	8% (54%)	88% (31%)
Stress the global importance of air pollution monitoring by closer cooperation with networks outside Europe	12% (31%)	4% (42%)	86% (27%)
Encourage and increase future collaborations with other research activities and monitoring platforms	0% (4%)	15% (23%)	85% (73%)
Feed information into other bodies/programs (e.g. FAO, Forest Europe)	0% (16%)	8% (23%)	92% (41%)

## National use of the current ICP Forests Strategy

We were also interested in learning whether the strategy was receiving attention at the national level. 65% of the countries participating in the survey have used or referred to the current strategy in their national work in the last 5 years, and 61% of the countries participating in the survey are planning to use the ICP Forests Strategy in their national work in the years to come. In 13 of the 24 countries (54%) participating in the survey, the current ICP Forests Strategy has helped to strengthen national monitoring activities. Moreover, the current ICP Forests Strategy has helped secure long-term funding for national monitoring activities (infrastructure and staff) in a third (33%, 8 countries) of the countries participating in the survey.

## Member states' views on expanding the ICP Forests activities

The third part of the questionnaire dealt with the future of ICP Forests. We asked whether the focus of ICP Forests should be expanded, and for this we listed concrete topics for increasing its scope. 89% of the countries participating in the survey agreed that the ICP Forests activities need to be expanded to better address rising issues other than air pollution. Table 8-2 shows the

member states' priorities for the proposed topics, which are increasingly relevant in research, practice, and policy.

For 88% of the countries participating in the survey, the expansion of the strategy through topics such as 'Interaction with climate change and extremes' or 'Impact on carbon sequestration' are of high to essential priority. And for about half of the countries participating in the survey, topics such as 'Water purification' or 'Heavy metals as additional pollutants' are of high to essential priority for the new strategy. Other topics such as 'Pesticides/Insecticides', 'Microplastics', or 'Per- & polyfluoroalkyl substances' were considered as less relevant for ICP Forests.

## Summary and conclusions

The survey results show that the current strategy is still relevant and timely. The strategy has helped in many member states to (i) strengthen monitoring activities and (ii) secure financial resources for monitoring infrastructure and staff. However, financial resources for monitoring infrastructure and personnel are always an issue; more activities to secure the program are highly desirable. Activities to expand the program were included in the new ICP Forests Strategy (s. b.).

**Table 8-2: Member states' priorities for proposed topics to expand the ICP Forest Strategy.**

Objectives and actions	Priority		
	No answer		
	No or low priority	Neutral	Essential / high
Interaction with climate change and extremes	8%	4%	88%
Impact on carbon sequestration	8%	4%	88%
Impact on biodiversity	12%	8%	80%
Heavy metals as additional pollutants	23%	31%	46%
Impact on water purification	23%	31%	46%
Pesticides/ insecticides as additional pollutants	46%	31%	23%
Microplastics as additional pollutants	35%	46%	19%
Per- & polyfluoroalkyl substances as additional pollutants	35%	46%	19%

# STRATEGY OF ICP FORESTS 2024–2030

*This strategy is based on the previous ICP Forests Strategy 2016–2023, which has been revised by (in alphabetical order) Nathalie Cools, Bruno De Vos, Marco Ferretti, Char Hllgers, Alexa Michel, Anne-Katrin Prescher, Marcus Schaub, Kai Schwärzel, and Lars Vesterdal. It has been approved by the ICP Forests Task Force in July 2023.*

## I ICP FORESTS in short

The 'International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests' (ICP Forests) is a work program within the 'Working Group on Effects' (WGE) of the 'Convention on Long-range Transboundary Air Pollution' (Air Convention or CLRTAP) under the United Nations Economic Commission for Europe (UNECE). ICP Forests is led by a Chairperson and administered by its Programme Co-ordinating Centre (PCC). The general assembly of the participating countries is the Task Force (TF) of ICP Forests. The Programme Co-ordinating Group (PCG), the Scientific Committee (SC), the Quality Assurance Committee (QAC), the Expert Panels (EP), the Working Groups (WG), and the National Focal Centres (NFC) contribute to the Program.

## II Mission statement

The mission of ICP Forests is to carry out multifunctional long-term monitoring of forests within the UNECE region and beyond, and to provide scientific knowledge on the effects of air pollution, climate change, and other stressors to forest ecosystems.

## III Aims

ICP Forests pursues the following aims:

- **Forest condition.** Provide a continued overview on forest health, vitality, forest soil condition, and biodiversity status in relation to anthropogenic (air pollution, atmospheric deposition, climate change) and natural stressors.
- **Cause-effect relationships.** Contribute to a better understanding of cause-effect relationships between anthropogenic as well as natural stressors and forest condition and processes.
- **High quality data.** Provide high quality and open access data managed in one central database for risk assessment for forests across Europe, large-scale and long-term trend analyses as well as model validation and calibration, serving also as a reference for global assessments.
- **Research Infrastructure.** Develop and maintain highly equipped forest measurement stations as central data hubs and research infrastructures (RI) to support standardized forest monitoring across Europe.

## IV Features of the current programme

ICP Forests works at two levels:

- The systematic large-scale monitoring (**Level I**) provides periodic overviews of the spatial and temporal variation in forest health, vitality, and forest soil condition.
- The intensive monitoring (**Level II**) is carried out on permanent, highly equipped forest monitoring plots to foster integrative studies on cause-effect relationships based on consistent and harmonized long-term data series.

All monitoring activities are described in the "Manual on methods and criteria for harmonized sampling, assessment, monitoring, and analysis of the effects of air pollution on forests". This ensures reliable and consistent information and quality assurance by a standardized approach for data collection and evaluation.

### Quality assurance and control

A consistent quality assurance is guaranteed for the set-up of methods, data collection, submission, validation, as well as reporting and publishing. This includes field checks, inter-calibration and cross-comparison courses, inter-laboratory ring tests, data validation procedures, and internal reviewing.

### Data and database

A large range of data is provided. All data are stored in a central database and managed according to agreed guidelines as laid down in the Manual. Data are available for internal and external use upon request.

### Evaluation, reporting and publishing

ICP Forests

- publishes annual **technical reports** on main scientific topics including long-term effects from e.g. acidification, eutrophication, ozone and other relevant impacts on forest ecosystems;
- publishes **ICP Forests Briefs** with concise information on the monitoring program and its latest scientific findings addressing policymakers and the interested public;
- publishes **scientific papers** in peer-reviewed scientific journals addressing the scientific community;

- organizes scientific conferences and strives to publish **proceedings** to foster the exchange among scientists, stakeholders and policy makers;
- encourages participating countries to publish **national forest reports**, which complement and support the ICP Forests dissemination efforts.

## V Vision for the future

Our vision is a European-wide forest monitoring infrastructure, integrating multiple levels and providing high-quality, transparent, robust, and open access data (i) on the status and trends of forest health, vitality, productivity, and biodiversity; (ii) on risks of forests being exposed to anthropogenic and natural stressors (separately and combined), and (iii) on progress in achieving relevant policy goals to reduce such risks.

## VI Objectives and actions

We focus on new challenges for forest health, vitality, and diversity in relation to the impact of transboundary air pollution and climate change to further develop the ICP Forests program in the next period (2024–2030). To support the work towards our vision, ICP Forests is committed to:

- **intensify the co-ordination** of the national monitoring activities by offering standardized methodologies, research infrastructure and facilities to potential users, such as forest authorities, environmental agencies, and research institutions, for additional research activities complementing the central purpose and data, thereby deriving improvements and/or extensions such as long-term experimental monitoring sites to the program;
- **broaden the scope of monitoring activities** for the unique long-term data series of traits and processes in forest ecosystems by investigating topics such as climate change effects, ecosystem services (carbon sequestration, water provision and purification), heavy metals as additional pollutants, and biodiversity across extended spatial and temporal scales;
- **follow-up on relevant international policy issues** by offering collaboration and scientific expertise background for forest related policies and providing advice to national and European policy makers;
- **strive for long-term financing** of activities, particularly including the maintenance of existing infrastructure and required staff as well as exploring more mechanisms for sustainable funding;
- **increase the visibility** of the program to improve the acknowledgement as well as the funding opportunities by (i) organizing scientific conferences, conference sessions, and workshops (partly in co-operation with other ICPs and forest research organizations), (ii) publishing peer-reviewed scientific articles in highly ranked journals and brochures, and educational videos for the general public and political stakeholders, (iii) launching a new comprehensive ICP Forests website, and (iv) regularly assessing the need for the use of social media;
- **foster a high quality and transparent database** and work towards open access to researchers and stakeholders;
- **strive towards maintaining field measurement methods** at the latest state-of-the-art to guarantee for high-quality data; a review of the Manual every five years and Expert Panel meetings continuously promote the awareness and discussions on the latest methodologies and instrumentation while continuing the existing time series;
- **explore new tools and technologies** (e.g. satellites, remote sensors, proximal sensing, new analytical instruments, modelling tools, information technology) and strive to incorporate them into the program;
- **use monitoring data** for developing cause-effect relationships, long-term trend analyses, modelling (calibration, parameterization, and validation) and evaluating effects of forest management and environmental policy strategies;
- **enhance co-operation with other ICPs** to promote integrated and cross-sectorial evaluations and reporting as well as unified measurement protocols through e.g. mutual funding and scientific conferences;
- **stress the global importance of air pollution monitoring** and increase the motivation to common activities by closer collaboration with monitoring networks inside and outside of Europe, such as NADP (USA) and EANET (East Asia), and by inviting members from SEE and EECCA countries into the ICP Forests network;
- **encourage and increase future collaborations** with other research activities and monitoring platforms by joint use of research infrastructures, open data access, data harmonization, federated databases, and large-scale scientific evaluations and hereby attain possibilities for an even more comprehensive terrestrial monitoring research program;
- **feed information into other bodies and programs** such as the FAO Forest Resources Assessment (FRA 2015 and its long-term strategy), the Ministerial Conference on the Protection of Forests in Europe (*Forest Europe*), the UN Convention on Biological Diversity (CBD), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the Framework Convention on Climate Change (UNFCCC), and other appropriate bodies, e.g. of the European Commission (EC).



## VII Adoption

This strategy of ICP Forests is fully in line with the Long-term strategy for the Convention (2020–2030, ECE/EB.AIR/142/Add.2)<sup>1</sup>, the Strategy for scientific bodies under the Convention on Long-range Transboundary Air Pollution (2022–2030 and beyond, ECE/EB.AIR/2022/10)<sup>2</sup>, and the most recent work plan (ECE/EB.AIR/148/Add.1<sup>3</sup>) for the effects-oriented activities of the WGE under the Convention.

This document was adopted at the 39<sup>th</sup> Meeting of the Program Task Force of ICP Forests, 6–8 June 2023. By the end of 2023, ICP Forests develops a plan for how and when to work towards implementation of each of the actions. In the year 2027, a mid-term review of this strategy will take place.

## VIII Diversity statement

ICP Forests is largely based on the scientific and technical development carried out within Expert Panels, Committees, and Working Groups. In appointing the chairs and vice-chairs for all these, ICP Forests strives for a high degree of diversity. ICP Forests welcomes participation in leadership from all ICP Forests member states, and positions itself against discrimination, as defined in the Secretary-General's Bulletin ST/SGB/2019/8 of the UN.<sup>4</sup>

## APPENDIX 1: Area of implementation and member states

The ICP Forests Strategy 2024–2030 is targeted at all 51 Parties (as of January 2023) of the UNECE Convention on Long-range Transboundary Air Pollution (Air Convention): Albania<sup>5</sup>, Armenia<sup>6</sup>, Austria, Azerbaijan<sup>3</sup>, Belarus<sup>3</sup>, Belgium, Bosnia and Herzegovina<sup>2</sup>, Bulgaria<sup>2</sup>, Canada, Croatia<sup>2</sup>, Cyprus, Czechia, Denmark, Estonia, Finland, France, Georgia<sup>3</sup>, Germany, Greece<sup>2</sup>, Hungary, Iceland, Ireland, Italy, Kazakhstan<sup>3</sup>, Kyrgyzstan<sup>3</sup>, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Montenegro, Netherlands, Norway, North Macedonia<sup>2</sup>, Poland, Portugal, Republic of Moldova<sup>2</sup>, Romania<sup>2</sup>, Russian Federation<sup>3</sup>, Serbia<sup>2</sup>, Slovakia, Slovenia<sup>2</sup>, Spain, Sweden, Switzerland, Türkiye<sup>2</sup>, Ukraine<sup>3</sup>, United Kingdom, United States of America, and the European Union.

ICP Forests has 42 members (as of January 2023): Albania, Andorra, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Montenegro, Netherlands, Norway, North Macedonia, Poland, Portugal, Republic of Moldova, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye, Ukraine, United Kingdom, and the United States of America.

<sup>1</sup> [https://unece.org/fileadmin/DAM/env/documents/2018/Air/EB/correct\\_numbering\\_Decision\\_2018\\_5.pdf](https://unece.org/fileadmin/DAM/env/documents/2018/Air/EB/correct_numbering_Decision_2018_5.pdf)

<sup>2</sup> <https://unece.org/sites/default/files/2022-12/2215606E.pdf>

<sup>3</sup> [https://unece.org/sites/default/files/2023-06/ECE\\_EB.AIR\\_148\\_Add.1-2209220E.pdf](https://unece.org/sites/default/files/2023-06/ECE_EB.AIR_148_Add.1-2209220E.pdf)

<sup>4</sup> Secretary-General's Bulletin ST/SGB/2019/8 (<https://undocs.org/ST/SGB/2019/8>)  
1.2 Discrimination is any unfair treatment or arbitrary distinction based on a person's race, sex, gender, sexual orientation, gender identity, gender

expression, religion, nationality, ethnic origin, disability, age, language, social origin or other similar shared characteristic or trait. Discrimination may be an isolated event affecting one person or a group of persons similarly situated, or may manifest itself through harassment or abuse of authority.

<sup>5</sup> South East Europe (SEE) Programme of the EU

<sup>6</sup> Eastern Europe, Caucasus, and Central Asia (EECCA) region of the OECD