From wood wisdom to wood values and beyond

Research project collaborations for increased innovation and competitiveness of the European forest-based sector

D5.2 Monograph publication on the impact of EU collaboration in the forest-based sector

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 773324

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List of abbreviations

CSA – Coordination and support action

ERA – European Research Area

R&I – Research and innovation

RIA – Research and innovation action

RTD – Research technology and development

MVZI – Ministry of Higher Education, Science and Sport, Slovenia

MMM – Ministry of Agriculture and Forestry of Finland

WP – Work package

1. Executive summary

Photo: K. Ceglar personal archive

ERA-Net Cofund ForestValue, funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No 773324 and actively running from 1 October 2017 to 31 March 2023, builds on previous successful transnational collaborations within the European Research Area (ERA) and beyond in the field of research and innovation in the forest-based sector.

Among ForestValue's main activities is the implementation of two joint transnational calls for proposals to co-fund research and innovation in the forest-based sector. In addition to other project activities, one of the final tasks is the preparation of a monograph publication which aims to show how the past and current research programmes contribute to increased innovation and competitiveness of the European forest-based sector.

This publication brings together in one place information already published in various online sources. A significant part of it is devoted to brief presentations of all research projects funded under the two ForestValue calls for proposals. The icing on the cake, so to speak, are the contributions from eminent experts and coordinators of past and current projects who have been invited to share their experiences and expert opinions not only on the achievements of individual transnational project collaborations, but also on the impacts achieved on the development of research and innovation in the forest-based sector, on societal and bioeconomic development, and on the achievement of the Sustainable Development Goals (SDGs).

The information in this publication is largely based on the resources of the individual ERA-Net projects, namely WoodWidom-Net, WoodWidom-Net2, WoodWidom-Net+, Foresterra, Sumforest, ForestValue, Eufore (RIA project) and ForestValue2 (CSA project), and on publicly available sources from ERA-LEARN, CORDIS and Forest-Based Sector Technology Platform. The publication also includes many interactive links to reach existing relevant information.

As editor of the publication, I would like to personally thank all the contributors.

We hope that this publication will be useful and that it will reach as wide a range of users as possible. You are welcome to read and share!

Katja Ceglar

Ministry of Higher Education, Science and Innovation, Slovenia
ForestValue WP5 Leader
(communication, dissemination and exploitation of results)

2. A brief overview of ERA-Nets running under Framework Programmes FP6, FP7 and FP8

2.1. WoodWisdom-Net

Networking and Integration of National Programmes in the Area of Wood Material Science and Engineering

Basic information

Period: 01/2004–12/2008; status: inactive network; partnership format: ERA-NET; funding framework: FP6

Objective

The aim of the WoodWisdom-Net project was to create a common research platform by developing sustained collaboration between the European forestry sector and forest-based industry, the wood material research community and funding organisations and integrating research resources in different countries. Promoting the development of innovative forest-based products, processes and services, the collaboration was aimed at benefiting Europe's citizens and strengthening the competitiveness of Europe's forest sector and forest-based industry. The final goal of the WoodWisdom-Net consortium was to prepare and implement a cooperation agreement and launch a joint call for a transnational programme. The experience gained in the planning and implementation of the Finnish-Swedish co-funded Wood Material Science Programme, which started in early 2003, provided a good basis to build up a long-term European research area in wood material science. The structuring of the activities was grouped into two categories: information collection and cooperation objectives.

Consortium

The first ERA-NET on wood material science and engineering, WoodWisdom-Net, started in 2004 with 12 partners from 5 countries and was later in 2006 expanded with 6 new partners from 3 countries.

Coordinator

FI – Finnish Funding Agency for Technology and Innovation (TEKES)

Participants

AT – Austrian Research Promotion Agency (FFG)

DE – Federal Ministry of Education and Research (BMBF)

DE – Jülich Research Centre (JUELICH)

DK – Ministry of Science, Technology and Innovation – Danish Agency for Science, Technology and Innovation (DASTI)

DK – Danish Forest and Nature Agency (DFNA)

FI – Academy of Finland (AKA)

FI – Ministry of Agriculture and Forestry (MMM)

FR – French National Institute for Agricultural Research (INRA)

FR – Ministry of Agriculture/General Direction for Forest and Rural Affairs (MAAPR)

FR – Technical Centre for Wood and Furniture (CTBA)

NO – Norwegian Industrial and Regional Development Fund (SND)

NO – Research Council of Norway (RCN)

NO – Nordic Forest Research Cooperation Committee (SNS)

SE – Swedish Governmental Agency for Innovation Systems (VINNOVA)

SE- Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS)

UK – Forestry Commission (FC)

UK – Scottish Enterprise Dumfries and Galloway (SEDG)

Mapping and scoping activities

The ERA-Net WoodWisdom-Net had several tasks designated for mapping and scoping activities such as:

- Information exchange on research programmes (and research activities);

- Exchange of information on the political and institutional environment and implementation approaches of research programmes;
- Development of a networking and cooperation structure for programme makers and programme managers (information on programmes, projects, partners and other activities) in Europe;
- Identification of potentially relevant new partner countries to be involved in WoodWisdom-Net in the future;
- Documentation on common goals and activities within the national activities involved in the ERA-Net;
- Creating an overview on legal barriers that hinder transnational cooperation and guidelines and recommendations for future activities.

The main outcomes of the mapping and scoping activities were published in six reports:

Report 1-2005 – Overview of Evaluation Practices and Guidelines for Common Research Activities

Report 1-2006 – Overview on Barriers that Hinder Transnational Cooperation and Models for Future Cooperation

Report 2-2006 – National and Transnational Research Programmes of the WoodWisdom-Net Partners

Report 1-2008 – Best Practices of Research Programmes of the WoodWisdom-Net Partners in the Field of Wood and Forestry Research

Report 2-2008 – Foresight Report – Overview of Foresight Studies in WoodWisdom-Net Countries

Report 3-2008 – Report on WoodWisdom- Net Self-Evaluation

The project also created **a specific joint online database/document pool** (**Research Landscape Tool**) on national research programmes/ projects, which was designed to support the objectives of the development of networking and cooperation structure for programme makers and programme managers (information on programmes, projects, partners and other activities) in Europe and to collect relevant stakeholder information.

Research fields covered by the network:

Biotechnology, energy, the environment, food, agriculture and fisheries, industrial production, materials, nanosciences and nanotechnologies

1 joint transnational call (JC1) / 17 funded projects

JC1 (two stages), 01/11/2006–31/01/2007 – 1st stage, 74 submitted proposals by 30/04/2007; 2nd stage, 45 submitted proposals by 30/09/2007; 17 successful and funded projects.

First call, 2006

The first joint call for proposals within the WoodWisdom-Net Research

At the start of November 2006, the participating organisations launched the first two-step joint transnational call for proposals. The call was devoted to basic research, with **sub-call A** addressing **"Wood production and properties"** as applied to industrial research technology and development (RTD) and **sub-call B** addressing **"New wood-based products, efficient processes and sustainable forestry"**. In the two-stage procedure, 17 proposals were accepted for funding, the call having a total funding of over EUR 20 million. The share of public national funding was 70%, with industrial funding covering a further 15% and research centres' own funding the remaining 15%. It was very pleasing to note that a further seven countries (not ERA-NET partners) participated in the programme by providing funds to individual project participants.

List of selected projects by main research area:

FIBRES – Wood fibre properties and processing

Projects funded:

1. **BioPack** – Design of biocomposites based on nanocellulose and hemicelluloses for future packaging materials. Coordinator: STFI-Packforsk AB (Sweden). Participating countries: Sweden, Finland, France

2. **DesignCell** – Designed cellulosic nanostructures. Coordinator: STFI-Packforsk AB (Sweden). Participating countries: Sweden, Finland, France

3. **FibreSurf** – New biotechnical tools for wood fibre modification and analyses. Coordinator: Royal Institute of Technology (KTH), Division of Wood Biotechnology, School of Biotechnology (Sweden). Participating countries: Sweden, Finland, United Kingdom

4. **FUNFIREBIC** – Functional fibre reinforced biocomposites. Coordinator: Oy All-Plast Ab (Finland). Participating countries: Finland, Germany, Sweden

5. **HemiPop** – Engineering structure and properties of poplar hemicelluloses. Coordinator: University of Helsinki (Finland). Participating countries: Finland, Sweden, France

6. **PROBARK** – A sustainable process for production of green chemicals from softwood bark. Coordinator: VTT Technical Research Centre of Finland (Finland). Participating countries: Finland, Germany, Sweden

7. **ReCell** – Refined cellulose derivatives for high-value biomedical products. Coordinator: Royal Institute of Technology, Fibre and Polymer Technology (Sweden). Participating countries: Sweden, Germany, Finland

8. **WoodFibre3D** – Structure-property relations of wood fibres: 3D characterization and modelling. Coordinator: SINTEF Materials and Chemistry (Norway). Participating countries: Norway, Finland, Sweden, Denmark

WOOD – Wood materials and engineering

Projects funded:

1. **FireInTimber** – Fire resistance of innovative timber structures. Coordinator: SP Trätek/Wood Technology (Sweden). Participating countries: Sweden, Finland, Germany, France, Norway, United Kingdom, Austria, Switzerland, Estonia

2. **GRADEWOOD** – Grading of timber for engineering wood products. Coordinator: VTT Technical Research Centre of Finland (Finland). Participating countries: Finland, United Kingdom, France, Germany, Sweden, Austria, Slovenia

3. **Improved Moisture – Improved glued wood** – Modelling and mitigation of moisture-induced stresses. Coordinator: VTT Technical Research Centre of Finland (Finland). Participating countries: Finland, Sweden, Germany, Austria, China

4. **TES-Energy Facade** – Timber-based element systems for improving the energy efficiency of the building envelope. Coordinator: Technische Universität München (TUM), Timber Architecture (Germany). Participating countries: Germany, Finland, Norway

5. **WinFur** – Use of furfurylated wood for the production of high-performance windows made of European timbers. Coordinator: University of Göttingen, Institute of Wood Biology and Wood Technology (Germany). Participating countries: Germany, Norway, Sweden

6. **WoodExter** – Service life and performance of exterior wood above ground. Coordinator: SP Technical Research Institute of Sweden (Sweden). Participating countries: Sweden, United Kingdom, Finland, France, Austria, Norway, Germany, Belgium

FORESTRY – Wood resources and logistics

Projects funded:

1. **IRIS** – New technologies to optimise the wood information basis for forest industries – developing an integrated information system. Coordinator: Norwegian University of Life Sciences (UMB). Participating countries: Norway, Germany, Finland, Sweden, Ireland

2. **WOODVALUE** – Value creation in wood supply chains. Coordinator: The Finnish Forest Research Institute (Metla), Parkano Research Unit.

Participating countries: Finland, Germany, Sweden, United Kingdom, Denmark, Norway, Italy

3. **WOVEN** – Wood formation under varying environmental conditions. Coordinator: The Finnish Forest Research Institute (Metla). Participating countries: Finland, Norway, Sweden

- **WoodWisdom-Net on CORDIS**
- **WoodWisdom-Net on ERA-LEARN**

2.1.1. WoodWisdom-Net impacts achieved

Dr Christine Hagström-Näsi and Dr Leena Paavilainen (Finland)

Photo: Dr C. Hagström-Näsi personal archive

Photo: Dr L. Paavilainen personal archive

WoodWisdom-Net was a continuation to the national Finnish WoodWisdom Programme and the Finnish-Swedish Wood Material Science Programme. We had seen that knowhow and expertise to support development of sustainable and innovative forest-based products, processes and services needed broader shoulders, and the first ERA-Net scheme of the European Commission's 6th Framework Programme call opened at just the right moment. It allowed the strengthening of the cooperation in the sector (the area of wood material science and engineering) and the building of a common European research platform, with the goals being to generate innovations, build cooperation both within the cluster and with other sectors, and to enhance the generation of new business models.

The main goal of the WoodWisdom-Net in the first phase was to prepare and implement a new joint transnational wood material science and engineering research programme. In order to do that, WoodWisdom-Net built structures, mechanisms and processes for improved coherence and coordination in planning and implementation of the joint research activities. WoodWisdom-Net was one of the first ERA-Nets to succeed in opening a common call for proposals. In addition, to move from national to European networking, it was crucial to build networks through the value chain from science to business, involving networking of different actors, and to establish cooperation among the funding institutions in the participating countries.

WoodWisdom-Net worked in good coordination with the European Forest-Based Sector Technology Platform and was one important tool in implementing its Strategic Research Agenda. In that sense, WoodWisdom-Net was the first and crucial step towards establishing and enhancing the European Research Area within the forest-based sector.

WoodWisdom-Net was especially important for the wood-working sector, as that sector had not been very active in transnational research previously, which made it more visible in the European science community and opened up wood-related research to other domains. In addition, countries ("new member states", e.g. Slovenia) that had not previously been actively involved in the framework programmes joined the network.

Good cooperation and trust between the funding partners was key to the success and acted as a foundation for further joint activities.

The first phase of WoodWisdom-Net ended by implementing the first joint call for proposals and left it well equipped to continue its work. The continuations have after that launched **five more calls**.

2.2. WoodWisdom-Net2

Networking and Integration of National Programmes in the Area of Wood Material Science and Engineering in the Forest-Based Value Chains

Basic Information

Period: 03/2009–02/2012; status: inactive network; partnership format: ERA-NET; funding framework: FP7

Objective

The overall objective of WoodWisdpom-Net2 was to promote the transformation of the European F-BI from a resource-intensive to a value-added, knowledge-intensive, innovative and globally competitive industry based on the sustainable use of renewable raw materials. The steps to reach this overall objective were:

- Creating and establishing a common research and funding platform for long-lasting cooperation by deepening and broadening the cooperation of the national funding organisations and by inviting partners from additional new countries to join the platform;
- Assisting raw material optimisation (and efficient utilisation of raw material properties) in the development of innovative, eco-efficient processes, products and services along different forest-based value chains and thus promoting competitiveness of the sector; and
- Promoting the utilisation of cutting-edge knowledge for new applications at the crossroads between different technologies and disciplines – transformation of F-BI from a traditional separate value chain industry to an optimized multiple value chains industry which addresses customer needs, reduced resource consumption and increased value creation.

Besides the overall objective, the following specific objectives were defined:

- Broadening, strengthening, streamlining and deepening the cooperation at the European and national levels within the forest-based sector and with other relevant sectors. The final goal is long-lasting cooperation.

- Broadening, deepening, streamlining and strengthening the joint activities, including strengthening the existing ongoing transnational research programme to cover the whole innovation chain from science to business by launching new calls, reinforcing industry involvement and developing management of a transnational programme.
- Launching new calls (the goal was to further develop the WoodWisdom-Net research programme by **launching joint calls** for projects in 2009 (Joint Call 2) and 2010 (Joint Call 3).

Consortium

The consortium included 19 partners from 12 countries.

Coordinator

FI – Finnish Funding Agency for Technology and Innovation (TEKES)

Participants

DE – Federal Ministry of Education and Research (BMBF)

DE – Jülich Research Centre (JUELICH)

ES – National Institute for Agriculture, Technology and Food Research (INIA)

FI – Academy of Finland (AKA)

FI – Ministry of Agriculture and Forestry (MMM)

FR – French National Institute for Agricultural Research (INRA)

FR – Ministry of Agriculture, the Food Processing Industry and Forestry/ General Directorate for Agricultural, Agrifood and Regional Policies (MAAF/ DGPAAT)

FR – Technological Institute for Forest Cellulose, Construction-Wood and Furniture (FCBA)

HU – Ministry of Rural Development (KvVM)

IE – National Council for Forest Research and Development (COFORD)

IT – Ministry of Agricultural, Food and Forestry Policies (MiPAAF)

LV – Latvian Academy of Sciences (LAS)

LV – Ministry of Agriculture Republic of Latvia (ZM)

NO – Research Council of Norway (RCN)

SE – Swedish Governmental Agency for Innovation Systems (VINNOVA)

SE – Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS)

SI – Ministry of Higher Education, Science and Technology (MHEST)

TR – Scientific and Technological Research Council of Turkey (TUBITAK)

Mapping and scoping activities

WoodWisdom-Net2 has been very active and successful in tying together all relevant stakeholders of the forest-based sector. One of the work packages, "Strategic Network Development", was especially allocated to this task. The proactive dissemination activities have led to good visibility, as the programme has been actively present at all important conferences and meetings within the sector. As the call themes have very often been interdisciplinary, the network has opened up to other domains, which proved to be very fruitful and culminated in the joint call with another relevant ERA-NET, ERA-NET Bioenergy. As a consequence, the forest-based sector was then better equipped with competencies for successful collaboration with other disciplines in larger projects. First efforts in using networking instruments like COST have been undertaken, and the aim is to increase their use in the future.

Joint calls

Following the first call conducted by WoodWisdom-NET under FP6, **two more calls were launched by WoodWisdom-Net2**.

Joint transnational call, 2009 (2nd joint call)

The 2nd joint call for proposals, "Sustainable, competitive processing and end-use concepts for forest-based industries", was launched in autumn 2009. The 2nd call was focused on applied research and development projects and the themes and topics for the call were defined by the national funding organisations, together with industry, based on strategies described in the SRA and NRAs of the forest-based sector. The focused call topics were aimed at activating industry partners to participate more in the WoodWisdom-Net research programme and to create closer interaction between the research community and applied product development. This resulted in 38 proposals, involving partners from 17 different countries and additional associated countries such as Belgium and Brazil. After evaluation by an international expert panel, nine projects were funded and these started with a kick-off session at the WoodWisdom-Net programme seminar in Paris in February 2011. The total value of the projects was over EUR 13 million, public WoodWisdom-Net funding accounting for 68% (nine million euros), industrial funding of the company projects 8% (one million euros), industrial funding of research projects 12% (EUR 1.5 million), and research centres' own funding 12% (EUR 1.5 million).

List of selected projects by main research area:

Research area 1. Improving the performance of energy- and resource-efficient timber construction (massive or light-weight, new construction or renovation concepts) with new concepts, tools and processes considering total building performance.

1. **Acuwood** – Acoustics in wooden buildings overview. Coordinator: SP Trätek (Sweden). Participating countries: Sweden, Germany, Switzerland

2. **ECO2** – Wood in carbon-efficient construction overview. Coordinator: Aalto University (Finland). Participating countries: Finland, Sweden, Germany, Italy, Austria

3. **smartTES** – Innovation in timber construction for the modernisation of the building envelope overview. Coordinator: Technische Universität München (Germany). Participating countries: Germany, Finland, Norway, Austria

Research area 2. Creating new business opportunities through innovative wood- and fibre-based products and composites with properties optimised to the end use requirements and sustainable use of resources.

4. **Lilo** – High-impact lignin-cellulose composites for logistics – development of advanced lignin-cellulose composites with high-impact properties for modular pallets and components for transport systems overview. Coordinator: Tecnaro GmbH (Germany). Participating countries: Germany, Finland, Latvia, Turkey

5. **MouldPulp** – Development of durable, fully bio-based thermoplastic composites from bioplastics and pulp fibres for injection moulding applications overview. Coordinator: Fraunhofer-Institute for Environmental, Safety, and Energy Technology UMSICHT (Germany). Participating countries: Germany, Sweden, Finland

Research area 3. Increasing the competitiveness of the forest-based value chain by strategic technology renewal, new business strategies and production systems.

6. **CTPro** – New forest industry production systems based on high-speed CT scanning overview. Coordinator: SP Trätek (Sweden). Participating countries: Germany, Sweden, Italy

7. **HI-FRETECH** – High-frequency impregnation of wood overview. Coordinator: Georg-August-Universität Göttingen (Germany). Participating countries: Germany, Norway, Spain, Denmark

8. **WoodSens** – Developing and implementing formaldehyde online-senor systems in wood-based panel processing. Coordinator: Georg-August-University Göttingen (Germany). Participating countries: Germany, France, Spain

Research area 4. Optimising end-of-life of wood-based products considering their total life cycle.

9. **DEMOWOOD** – Optimisation of material recycling and energy recovery from waste and demolition wood in different value chains. Coordinator: FCBA (Germany). Participating countries: Germany, France, Finland

Third call, 2010

The 3rd call of WoodWisdom-Net2 was arranged together with ERA-Net Bioenergy. This joint call, for **"Sustainable forest management and optimised use of ligno-cellulosic resources – Bridging gaps between research disciplines, producers, consumers and society"**, was launched on 15 September 2010. In this call, ERA-Nets WoodWisdom-Net2 and ERA-Net Bioenergy aimed to step up the cooperation and coordination of research activities carried out at national and regional levels by joining forces to promote innovative research and cooperation to help optimise the use of trees and forests. The public funding was jointly provided by 19 national funding organisations from Finland, France, Germany, Ireland, Italy, Latvia, Norway, Poland, Slovenia, Spain, Sweden, Turkey and the United Kingdom between 2011 and 2014.

During this two-step call, 13 projects were funded within the framework of the available national budgets. The total value of these 13 projects was close to EUR 21 million, the share of public WoodWisdom-Net funding being EUR 13.7 million and the rest (ca. 7 million euros) coming from other co-funding sources (industrial co-funding etc.). As well as the main participants, some of the projects had partners from Austria, Brazil and Chile.

List of selected projects sorted by main research area:

Area 1: Forest for multiple needs of society, including enhanced productivity and optimised use of forest feedstock

1. **AgroCop** – Maximising timber and energy wood production by innovative agroforestry systems with short rotation coppice as intercrop. Coordinator: Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg (Germany). Participating countries: DE, F, IE, I

2. **BIOFOAMBARK** – Bark valorisation into insulating foams and bioenergy. Coordinator: Institute for Forest Utilization and Works Science and Freiburg Materials Research Center (FMF) (Germany). Participating countries: DE, FI, SI, F, ES, I

3. **COOL** – COmpeting Uses of FOrest Land. The future of integrative and segregative policy and forest management approaches in Europe. Coordinator: Institute of Forest and Environmental Policy (Germany). Participating countries: Germany, Finland, Slovenia, Spain, Norway

4. **RegioPower** – A regional IT-based platform for bringing resource needs and land-based resource production together. Coordinator: Rheinische Friedrich-Wilhelms-Universität Bonn (Germany). Participating countries: Germany, Sweden, Finland, Slovenia; associated partner in China

5. **WOP** – WoodSupply. Coordinator: University of Helsinki (Finland). Participating countries: Finland, Sweden, Germany

Area 2: Advanced products and technologies for primary wood processing and manufacturing of wood and fibre-based products

6. **Cell-Assembly** – Self-assembled biomimetic wood-based nanocomposites. Coordinator: Aalto University/Physics (Finland). Participating countries: Finland, Sweden, Germany

7. **LBTGC** – Load-bearing timber-glass composite structures. Coordinator: Vienna University of Technology (Austria). Participating countries: Austria, Germany, Sweden, Turkey, Slovenia, Chile, Brazil

8. **PowerBonds** – Enhancement of fibre and bond strength properties for creating added value in paper products. Coordinator: Tampere University of Technology (Finland). Participating countries: Finland, Germany, France, Sweden, Austria

9. **WOBAMA** – Wood-based materials and fuel. Coordinator: KTH Royal Institute of Technology (Sweden). Participating countries: Sweden, France, Finland, Poland

10. **WoodApps** – Improvement in collaboration along the wood value chain through knowledge-based methods and mobile applications. Coordinator: HCN e.V. – High Competence Network (Germany). Participating countries: Germany, Slovenia, Sweden, Ireland

Area 3: Advanced biofuels and biorefineries

11. **GREASE** – A novel lipid platform to sustainable bio-based products from low-value forestry streams through multi-functional fatty acids. Coordinator: VTT Technical Research Centre Finland (Finland). Participating countries: Finland, Germany, Turkey, Sweden, Italy, Finland

12. **PINOBIO** – Pinosylvins as novel bioactive agents for food applications. Coordinator: University of Eastern Finland (Finland). Participating countries: Finland, Spain, Latvia, Slovenia

13. **ProLignin** – High-value products from lignin side-steams of modern biorefineries. Coordinator: VTT Technical Research Centre of Finland (Finland). Participating countries: United States, Germany, Latvia, Spain, Italy, Finland, Brazil

- **WoodWisdom-Net2 on CORDIS**
- **WoodWisdom-Net2 on ERA-LEARN**

2.2.1. WoodWisdom-Net2 impacts achieved, Legacy of WoodWisdom-Net

Dr Ilmari Absetz

Photo: Dr I. Absetz personal archive

WoodWisdom-Net was able to show multiple impacts at both project and network level. The continuous long-term collaboration since 2004 has been important competence- and capacity-building, including development and improvement of capabilities and skills. For example, attitudinal or cultural change such as reciprocal understanding and willingness to work together, conceptual impacts, influences on policy issues, and structural impacts of changes in institutions and structures in the national or European research landscape are recognised. WoodWisdom-Net has successfully established and deepened the collaboration between research organisations, companies, stakeholders and funders.

WoodWisdom-Net has also been an important competence-building platform of transnational RDI in the evolving development of the forest-based sector. Numerous organisational and training impacts of the WoodWisdom-Net programme and projects are based on active participation of young scientists building up their competencies together with more experienced leading RDI teams.

At project portfolio level, the impacts are even wider, varying from science, innovation and economic impacts, including a basis for international harmonisation and standardisation, bioeconomy going towards circular economy, to environmental, cultural and societal impacts, especially on sustainable development and climate change. Also the first projects towards the societal perception of the forest-based sector have been completed.

Career boosting into influential positions has been one remarkable outcome of the WoodWisdom-Net community with strong and broad long-term national and European impact. WoodWisdom-Net has been an important step in career development for many key people in different roles of project and programme activities. Career development to influential positions such as doctors, professors and rectors in universities and research, development, innovation and business directors in public and private research organisations is recognized. Also some leading researchers have become research-based start-up entrepreneurs. All these people have learned something valuable within Woodwisdom-Net and taken their learnings as assets into their next challenges.

One success case of WoodWisdom-Net2 project is ECO2 – “Wood in carbon-efficient construction 2011–2013”. The project was a forerunner in sustainable carbon-neutral wood construction, currently a strategic objective of 100 climate-neutral smart cities in Europe. The project coordinator Matti Kuittinen did his doctoral thesis based on the project.

Matti is currently 1st Senior Ministerial Advisor at the Ministry of the Environment of Finland and Adjunct Professor in Aalto University. Matti was also the main organiser and moderator in the launch of the New European Bauhaus Academy by EU President Ursula von der Leyen at the “New European Bauhaus Goes into the Woods” event, with high-level support from PM Sanna Marin (FI), PM Kaja Kallas (EE), Deputy PM Ebba Busch (SE), Minister for the Environment and Climate Change Maria Ohisalo (FI), Minister for Agriculture and Forestry Antti Kurvinen (FI), and Commissioner for the Environment Virginijus Sinkevičius. Thus the results and outcomes of projects and the influence of people have both had a strong and long-term impact as a legacy of WoodWisdom-Net.

2.3. WoodWisdom-Net+

WoodWisdom-Net+ – Pacing Innovation in the Forest-Based Sector

Photo: ©ForestValue 2022

Basic Information

Period: 11/2012–11/2017; status: inactive network; partnership format: ERA-NET plus; funding framework: FP7

Objective

The overall objective of WoodWisdom-Net+ was to support the transformation of the European F-BI and sustainable forest management for increasing resource efficiency and adapting to and mitigating climate change effects. This was achieved by integrating knowledge and technologies of large-scale industrial products and processes and of primary production. The aim was to plan a single joint call for proposals for research, development and innovation in the forest sector with a clear financial commitment from the participating national (or regional) research programmes and the EU. The estimated total funding value of the joint call was ca. EUR 30 million (the share of industry funding being EUR 5–10 million).

The main approach in WoodWisdom-Net+ was the substitution of non-renewable resources (e.g. materials or fossil fuels) by renewable forest-based solutions to reduce carbon emissions and waste. The joint transnational call addressed the whole forest-based value chain in four

areas. These were 1) the sustainable management of forest resources through 2) their efficient utilisation in industrial processes towards 3) value added products and 4) competitive customer solutions. The exact scope will be defined during the project.

WoodWisdom-Net+ based its research, development and innovation funding activities on the processes and experience developed during the preceding ERA-NETs towards streamlined and efficient processes. The preceding ERA-NETs WoodWisdom-Net (2004–2008) and WoodWisdom-Net2 (2009–2012) form the transnational WoodWisdom-Net Research Programme (total funding of the launched three calls: ca. EUR 50 million), which provided the planned ERA-NET Plus Action with a solid foundation. WoodWisdom-Net+ continued to improve the delivery of joint activities and had ambitious goals for funding transnational research and offering access to the resources of other countries.

Consortium

WoodWisdom-Net+ consists of 20 partners from 12 different countries.

Coordinator

FI – Finnish Funding Agency for Technology and Innovation (TEKES)

Participants

AT – Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)

CH – Federal Department of Economic Affairs FDEA – Commission for Technology and Innovation (KTI)

CH – Federal Department for Environment, Transports, Energy and Communication (BAFU)

DE – Agency for Renewable Resources (FNR)

FI – Academy of Finland (AKA)

FI – Ministry of Agriculture and Forestry (MMM)

FR – Ministry of Agriculture, Food, Fisheries and Rural Affairs (MAA)

FR – Technological Institute for Forest Cellulose, Construction-wood and Furniture (FCBA)

FR – French National Institute for Agricultural Research (INRA)

FR – French Environment and Energy Management Agency (ADEME)

IE – Department of Agriculture, Food and the Marine (DAFMCOFORD)

LV – Latvian Academy of Sciences (LAS)

LV – Ministry of Agriculture Republic of Latvia (ZM)

NO – Research Council of Norway (RCN)

SE – Swedish Energy Agency (SWEA)

SE – Swedish Governmental Agency for Innovation Systems (VINNOVA)

SI – Ministry of Education, Science, Culture and Sport (MESCS)

SK – Ministry of Agriculture and Rural Development of the Slovak Republic (MPRV SR)

UK – Forestry Commissioners (FC)

Mapping and scoping activities

While the ERA-NET scheme supported the coordination of the launch of joint calls for proposals, ERA-NET Plus focused on funding of the actual R&D-activities. Extensive mapping had been carried out under WoodWisdom-Net and WoodWisdom-Net2 and was therefore not foreseen in the context of this ERA-NET Plus.

Joint call – fourth call, 2013–2016

Joint call, 2013–2016 – The 4th joint call for proposals within the WoodWisdom-Net research programme

The WoodWisdom-Net research programme announced in February 2013 its fourth call for joint European research projects. The indicative total available budget amounted to EUR 24 million (national public funding including EC top-up funding of eight million euros). The total call value with industrial co-funding was ca. EUR 30 million.

The overarching aim of this 4th call under the transnational WoodWisdom-Net research programme was to support the total transformation of the European F-BI and sustainable forest management to enable it to increase resource efficiency and develop a totally new products scope, while adapting to and mitigating the impacts of climate change.

The main approach in WoodWisdom-Net+ was the substitution of non-renewable resources (e.g. materials or fossil fuels) by renewable forest-based solutions to reduce carbon emissions and waste. The joint transnational call will address all forest-based value chains in four areas. These were 1) the sustainable management of forest resources through 2) their efficient utilisation in industrial processes towards 3) value added products and 4) competitive customer solutions.

The initiative was intended to facilitate collaboration between industry, SMEs, stakeholder associations, research organisations, and leading-edge scientists from the wider range of disciplines covering wood material, construction, natural, biological, social, economic and other relevant sciences that brought their broad expertise to support the transformation of the European forest-based sector and to secure its competitiveness. Importantly, the call also aimed to encourage and make best use of

interdisciplinary, systems approaches and to improve the impact and integration of social research and economics in this area.

The funding organisations were particularly keen to encourage innovative transnational proposals from multidisciplinary groups of researchers with optimal combinations of expertise and experience (e.g. including early-stage researchers and staff exchange between partners) to address the call topic areas. The participation of commercial and industrial and/or other stakeholders – especially small and medium-sized enterprises (SMEs) – was strongly recommended to ensure the relevance of the research to technological development and to the needs of society.

Joint call, 2016 – 23 projects funded; duration 2014–2017

1. **AEROWOOD** – Wood-based aerogels, 5 partners, participating countries: FI, AT, F, DE, SI

2. **BIOCOPOL** – Enhancing wood durability and physical properties through innovative bio-based sustainable treatments, 6 partners, participating countries: CH, AT, F

3. **COMPAC** – Plasticised lignocellulose composites for packaging materials, 14 partners, participating countries: DE, FI, SE

4. **COSEPA** – Controlled separation and conversion processes for wood hemicelluloses, 14 partners, participating countries: FI, SE, DE, UK

5. **CaReWood** – Cascading recovered wood, 15 partners, participating countries: DE, FI, AT, F, SI

6. **CreoSub** – New protection technology to substitute creosote for the protection of railway sleepers, timber bridges and utility poles, 8 partners, participating countries: NO, FI, DE, UK

7. **DuraTB** – Durable timber bridges, 20 partners, participating countries: NO, FI, SE, USA

8. **EU Hardwoods** – European hardwoods for the building sector, 9 partners, participating countries: AT, SI DE, F

9. **FASTFORESTS** – Impacts of faster-growing forests on raw material properties with consideration of the potential effects of a changing climate on species choice, 6 partners participating countries: IE, F, DE

10. **HCLTP**- Hybrid cross laminated timber plates, 7 partners, participating countries: SI, DE, AT

11. **HEMICELL** – Wood-based chemicals, in particular chemical modified hemicellulose, used as functional additives to enhance the material properties of cellulose esters, 7 partners, participating countries: DE, SE , F

12. **LIGNOHTL** – Liquid fuels from lignin by hydrothermal liquefaction and deoxygenetion, 4 partners, participating countries: FI, DE, F

13. **PRONANOCELL** – Processes for nanocellulose composite manufacturing, 8 partners, participating countries: SE, FI, DE

14. **Pshapes** – Polysaccharide bioshapes – chemical design and shaping into new biomaterials, 8 partners, participating countries: FI, DE SI, AT

15. **ReWoBioRef** – Mobilisation and utilisation of recycled wood for ligno-cellulosic bio-refinery processes, 11 partners, participating countries: DE, FI, UK, SI, CA

16. **Silent Timber Build** – Silent timber buildings for the European market, 15 partners, participating countries: SE, AT, F, DE, NO, CH, BE

17. **TallFacades** – Tall timber facades, identification of cost-effective and resilient envelopes for wood constructions, 11 partners, participating countries: DE, NO, SE, F

18. **TunableFilms** – Tunable lignocellulose-based responsive films, 4 partners, participating countries: FI, SE, AT

19. **VARMA** – Value added by optimal wood raw material allocation and processing, 12 partners, participating countries: FI, EF, DE, UK

20. **W3B – Wood Believe** – Social perceptions of the forest-based sector and its products towards sustainable society, 13 partners, participating countries: AT, FI, DE, SI

21. **WoTIM** – Wood-based thermal insulation mate, 9 partners, participating countries: FI, SE, F

22. **Wood2New** – Competitive wood-based interior materials and systems for modern wood construction, 15 partners, participating countries: FI, NO, AT, SE, UK, BE

23. **leanWood** – Innovative lean processes and cooperation models for planning, production and maintenance of urban timber buildings, 16 partner, participating countries: DE, F, CH, FI

- **WoodWisdom-Net+ on CORDIS**
- **WoodWisdom-Net+ on ERA-LEARN**

2.4. Foresterra

Enhancing FOrest RESearch in the MediTERRAnian through improved integration and coordination

Basic Information

Period: 01/2012–12/2015; status: inactive network; partnership format: ERA-NET; funding framework: FP7

Objective

At the time of the Foresterra project design, forestry research in the Mediterranean region was handicapped by its fragmentation, its limited means, and occasional outdatedness and isolation. In addition, the low benefits that Mediterranean forests provide to forest-based industries – compared to other European forests – made it difficult to attract interest and funds from the private sector. For this reason, new ways to overcome this situation have been implemented through research partnerships, networking, capacity-building, higher education programmes, knowledge transfer and lifelong learning. Such activities have taken advantage of existing initiatives like the Forest-Based Sector Technology Platform (FTP), the Mediterranean Regional Office of the European Forest Institute (EFIMED), and the Mediterranean Forest Research Agenda (MFRA) developed jointly by the FTP and EFIMED.

Mediterranean forest ecosystems provide multiple goods and services that are crucial to the socioeconomic development of the Mediterranean regions' rural areas and to the welfare of its urban populations. Advancing scientific knowledge and fostering innovation is essential, then, to ensure the sustainable management of Mediterranean forests and to build a knowledge-based bioeconomy in the region.

The countries of the Mediterranean basin and those of other Mediterranean climate areas face similar challenges regarding the sustainability of forest ecosystems and the delivery of crucial goods and services that they provide in a context of rapid global changes. Therefore it was of critical importance to reinforce scientific cooperation on Mediterranean forests through a transnational EU-Mediterranean ERA-NET, which also built new transcontinental cooperation among Mediterranean climate areas (California, Australia, South Africa and Chile) in order to reduce fragmentation and maximise the impact of research activities.

Consortium Foresterra had 16 partners from 12 countries.

Coordinator

ES – Ministry of Economy and Competitiveness (MINECO)

Participants

BG – Executive Forestry Agency (EFA)

DZ – Ministry of Agriculture and Rural Development (INRF)

ES – Ministry of Economy and Competitiveness (MINECO)

FR – French National Institute for Agricultural Research (INRA)

FR – Ministry of Agriculture, Food and Forestry (MAAF)

GR – Ministry of Environment Energy and Climate Change (MEEC)

HR – Ministry of Science, Education and Sports (MZOS)

IT – Agricultural Research Council (CRA)

IT – Ministry of Agricultural, Food and Forestry Policies (MiPAAF)

MA – High Commission for Water and Forests and the Fight Against Desertification (HCEFLCD)

PT – Foundation for Science and Technology (FCT)

SI – Ministry of Agriculture, Forestry and Food (MAFF)

TR – Ministry of Forest and Water Affairs, Southwest Anatolia ForestResearch Institute (SAFRI)

TN – Institution for Agricultural Research and Higher Education (IRESA)

INT – European Forest Institute (EFIMED)

INT – Mediterranean Agronomic Institute of Zaragoza / International Centre for Advanced Mediterranean Agronomic Studies (IAMZCIHEAM)

Mapping and scoping activities

In the framework of Foresterra, an activity of mapping and characterising the existing forestry funding programmes and forestry research capacities of the countries participating in the consortium, which brought together 12 Mediterranean countries, was developed.

The mapping survey was performed using two procedures: i) dedicated questionnaires addressed to funding bodies and scientific organisations and ii) ad hoc poster session aimed at exchanging information and validating the preliminary results, attended by delegates from participating countries.

Funding, research capacities and research lines were characterised in order to identify complementarities, overlaps, gaps, strengths and weaknesses in forest research in order to provide strategic guidance to the Foresterra network for future cooperation and forest research coordination activities.

1 Joint Call

A call for proposals was launched in 2014, including large collaborative projects and networking actions.

Foresterra transnational call on "Mediterranean-scale approach to study global change drivers, impacts & indicators on forest ecosystems and to foster forest system resilience through managing biodiversity"

7 submitted proposals; 2 funded projects

1. **MedWildFireLab** – Networking action
2. **INFORMED** – Collaborative project

- **Foresterra on CORDIS**
- **Foresterra on ERA-LEARN**

2.4.1. Foresterra impacts achieved – Mediterranean forest research management

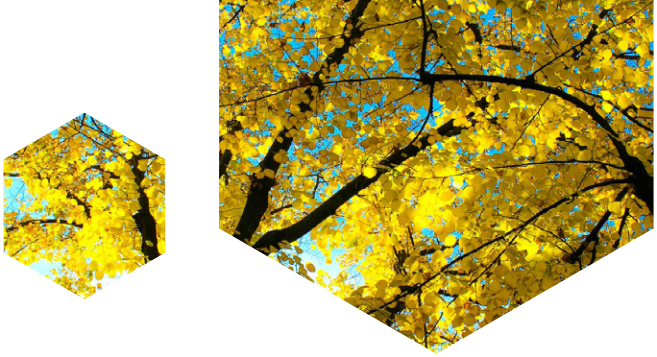
Dr David González Martínez (Spain)

A research coordination effort has been established to link and support investigations focused on Mediterranean forests, both in the Mediterranean and in Mediterranean climate areas.

Photo: Juho Luomala on Unsplash

Mediterranean forest ecosystems are a source of various goods and services that are key to socioeconomic development in the region. However, Mediterranean forest research has remained incoherent and poorly funded, resulting in under-performance in this important area. The EU-funded **Foresterra** (Enhancing forest research in the Mediterranean through improved coordination and integration) project put measures in place to rectify the situation. With a view to enhancing research coordination, support and impact, the project included countries and states from the Mediterranean and Mediterranean climate areas (Australia, California, Chile and South Africa). To achieve its aims, Foresterra mapped existing research capacity in all states by surveying funding bodies and scientific organisations. This was collated into a database of Mediterranean forestry research. The project also produced a strategic research plan based on the EU's Mediterranean Forest Research Agenda 2010–2020. This plan identifies four research priority areas: global climate change, biodiversity management, multi-use

forest management and watershed management. A major goal of Foresterra was to gain support for international collaboration and scientific cooperation. This was achieved by developing best practices for research programme management and providing guidelines for funding transnational research projects on this topic. The project's outcomes have led to better understanding of vulnerable Mediterranean forest ecosystems threatened by drastic land-use changes and climate changes. They have also generated deeper knowledge regarding the sustainability of forest ecosystems, including sustainable management related to delivery of forest goods and services. Lastly, the project improved policies regarding forestry and related fields, such as for water and biodiversity conservation. Networks with other EU-funded forestry projects have ensured useful uptake of the results and continuity of the efforts achieved under Foresterra.



2.5. Sumforest

Basic Information

Period: 01/2014–12/2017; status: inactive network; partnership format: ERA-NET; funding framework: FP7

Objective

Sumforest contributed to creating a European forest research area that comprised:

Well-coordinated European, national and regional research programmes and priorities that were needed to ensure the coherence of European, national and regional research programmes and priorities on issues of a generic nature and of European interest based on shared foresight exercises. Such coordination avoided unnecessary duplication of effort and facilitated the allocation of freed-up resources to strategic transnational issues that went beyond the capacities of individual countries. Transnational cooperation was considered the most appropriate response to the physical challenges confronting European forests and an efficient use of national and regional resources.

Effectively coordinated research institutions and centres of excellence are crucial to address the complex interdisciplinary and cross-sectorial nature of emerging forestry challenges. Many European forest research institutions lack critical mass and have difficulties meeting current expectations with the resources available. Therefore, some concentration and specialisation is necessary to permit the emergence of European forest centres of excellence which are competitive on a global scale. At the same time, more coordination and integration (this includes mobility of researchers) among institutions is required to address complex interdisciplinary questions.

Joint research facilities and pan-European networks of large-scale research infrastructures with long-term funding are required in key topic areas (information and monitoring of forest disturbances, genomics, impacts of climate change, forest policy and markets analysis, etc.) to ensure that European forest research has the right data at the right

scale to be at the frontier of knowledge and is able to address emerging challenges and policy issues in an efficient manner. Due to high costs and the transnational relevance of many questions, it makes sense to share and jointly plan these infrastructures.

Strengthened science-policy-practice interaction is crucial for sound policy-making and for fostering innovation within the forest-based sector. Speeding up the spread and integration of forest-related knowledge to the general public allowed the development of innovative products and services, turning challenges into business opportunities. In this context, new instruments and dynamic processes were established to foster a fluent science-policy dialogue. This is why Sumforest has been working closely with ThinkForest to strengthen communication, cooperation and partnership-building between EU policymakers (Member States, the European Parliament, the Commission, etc.) and the scientific community.

Consortium Sumforest had 23 partners from 18 countries.

Coordinator

AT – Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)

Participants

CH – Federal Office for the Environment (FOEN)

DE – Federal Ministry of Food, Agriculture and Consumer Protection (BMELV)

DE – Federal Agency of Agriculture and Food (BLE)

ES – National Institute for Agriculture, Technology and Food Research (INIA)

FI – Ministry of Agriculture and Forestry (MMM)

FR – Ecofor

GR – Democritus University of Thrace (DUTH)

GR – Ministry of Environment Energy and Climate Change (YPEKA)

IE – Department of Agriculture, Food and the Marine (DAFM)

IT – Ministry of Agricultural, Food and Forestry Policies (MiPAAF)

LT – Ministry of Environment (AM)

LV – Latvian Academy of Agriculture and Forestry Science (LAAFS)

MK – Ss. Cyril and Methodius University of Skopje – Faculty of Forestry (UkiM)

NO – Research Council of Norway (RCN)

PL – Forest Research Institute (IBL)

SE – Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS)

SI – Ministry of Education, Science, Culture and Sport (MESCS)

SI – Slovenian Ministry of Agriculture and the Environment (MKO)

SK – Ministry of Agriculture and Rural Development of the Slovak Republic (MPRV SR)

UK – Forestry Commissioners Research Agency (FC)

INT – European Forest Institute (EFI)

INT – Nordic Forest Research Cooperation Committee (SNS)

Mapping and scoping activities

The project started with mapping and information exchange to improve mutual knowledge of existing European, national and regional programmes and capacities. Although there had been some attempts to map relevant research programmes and capacities (e.g. WoodWisdomnet in FP6 and FP7, Trees4future, Star Colibri, Foresterra) those only had depicted a small part of the entire forest-related research activities. Sumforest drew on those results where it was relevant to SFM and multifunctional forestry and also added some additional new quantitative and/or qualitative mapping activities. Moreover the project mapped those European and national policies that had affected the forest sector. Sumforest utilised existing data (e.g. ThinkForest, COST E51).

An important task was the analysis of the collected data and the definition of common strategic activities in order to form scientific networks and enough critical mass of research capacities to effectively avoid overlaps and promote synergies among existing capacities. This process also contributed to the identification of scientific areas (opportunities and gaps) that require transnational funding. Moreover, the policy-related part of the project both detected inconsistencies and contradictory policies and delivered input towards new national and European policy and implementation activities (e.g. EU Forest strategy, national implementation of FLEGT and REDD(+)).

Joint call

1 joint transnational call in 2017 – 26 submitted proposals, 7 funded projects

The transnational call “Sustainable forests for the society of the future” was launched in March 2017. It was focused on basic and applied research that aimed to support policy decisions regarding multifunctional forestry. 7 out of 26 eligible proposals were funded. 18 different funding

organisations from 15 countries provided funding. The total amount of money granted was approximately EUR 8.3 million. 43 organisations are funded through Sumforest.

Three topics were chosen among:

- Comparative assessment of the sustainability performance of forest-based, other renewable and non-renewable raw material-based value chains to inform policy decisions.
- Risk-resilient forest management – Adapting forest management regimes which incorporate risk assessment related to potential climate change impacts to inform policy decisions.
- Investigation, appraisal and evaluation of trade-offs related to the provision of forest ecosystem services to inform policy decisions.

Sumforest call funded projects:

1. **BenchValue** – Benchmarking sustainability performance of value chains using ToSIA (Tool for Sustainability Impact Assessment)
2. **FOREXCLIM** – Forests and extreme weather events: Solutions for risk-resilient management in a changing climate
3. **ForRisk** – Forest density reduction to minimise the vulnerability of Norway spruce and silver fir to extreme drought – a risk assessment
4. **FutureBioEcon** – Sustainable future use of European forests for developing the bioeconomy
5. **REFORCE** – Resilience mechanisms for risk-adapted forest management under climate change
6. **REFORM** – Mixed species forest management. Lowering risk, increasing resilience
7. **POLYFORES** – Decision-making support for forest ecosystem services in Europe – Value assessment, synergy effects and trade-offs

➤ **Sumforest on CORDIS**

➤ **Sumforest in ERA-LEARN**

2.5.1. Sumforest impacts achieved

Dr Marin Greimel (Austria)

Photo: Dr M. Greimel personal archive

Looking back allows us to see the bigger picture and concentrate on impacts that were not so easy to see right after the end of Sumforest.

I would like to focus on 3 areas when describing the impact thereby not going into details as those are better outlined in the **final summary report**.

1.) Impacts created through networking

A core group of Sumforest partners have already been involved in previous ERA-NET initiatives, for example WWN, WWN+ and Foresterra. This circumstance allowed the very rapid establishing of a trustful relationship and even friendship that enabled the Sumforest team to solve very tricky problems that came up during the project (e.g. last-minute withdrawal of national funding by Russia after the Crimean occupation). Today the relationships built during Sumforest are still very powerful and allow the creation of follow-up initiatives. The supportive activities to include young forest researchers from Russia and Eastern partnership countries into international research activities established a network that is still very active despite political turbulences.

2) Impacts formed through the funded research projects

In 2014 most research projects concentrated on forest-specific problems and only to a tiny extent on challenges related to the forest-based value chain. Sumforest overcame this approach by funding research projects that put the value chain challenges in the centre, and the projects already had an approach towards a forest-based circular bioeconomy.

3) Influence of Sumforest on EU forest policy and EU forest research policy

Sumforest helped policymakers by providing a concise description and characterisation of the European Union forest policies and a tool for fact-based decision-making. By developing a comprehensive method for mapping forest research capacities, policymakers in the Member States and at the EU level could identify the main information and research needs and shape research funding programmes accordingly.

2.6. ForestValue

Photo: ©ForestValue 2022

Basic Information

Period: 10/2017–03/2023; status: active network; partnership format: ERA-NET Cofund; funding framework: FP8 / Horizon 2020

Objective

The overall objective of the Cofund action “ForestValue – Innovating the forest-based bioeconomy” is to promote increased innovation and competitiveness of the forest-based sector in Europe and support its transformation from a resource-intensive to a knowledge-intensive, productive, resource-efficient and resilient sector. Sustainability and modernisation of forestry systems and downstream value chains, including innovative business concepts and production technologies, are needed to develop the forestry sector and the European bioeconomy, of which forestry accounts for a large share.

The aim of ForestValue is to comprise the joint implementation of transnational calls for proposals for research, development and innovation in the forest-based sector with a clear financial commitment from the participating national (or regional) research programmes and the EU. The topics of the ForestValue joint calls contribute to transforming the global economy from a dependence on fossil and non-renewable raw

materials to a sustainable “bio-based economy”. The primary purpose is to allow the partners in the consortium to successfully implement and fund a co-funded joint call in the field of forestry and the wood sector.

Main research priorities of the network: H2020 Societal Challenges / H2020-SC2 (food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the bioeconomy).

The ForestValue consortium has 31 partners from 18 countries

Coordinator:

FI – Ministry of Agriculture and Forestry (MMM)

Participants:

AR – Ministry of Science, Technology and Productive Innovation (MINCYT)

AT – Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW)

CZ – Forestry and Game Management Research Institute (FGMRI)

CZ – Ministry of Agriculture, Department of Research, Education and Advisory Services (MZE)

EG – Academy of Scientific Research and Technology (ASRT)

FI – Academy of Finland (AKA)

FI – Finnish Funding Agency for Technology and Innovation (TEKES)

FI – Ministry of the Environment (FiMoE)

F – Agency for Environment and Energy Management (ADEME)

F – National Research Agency (ANR)

DE – Agency for Renewable Resources (FNR)

DE – Federal Agency for Agriculture and Food (BLE)

DE – Federal Ministry of Food and Agriculture (BMEL)

IE – Department of Agriculture, Food and the Marine (DAFF)

JO – National Center for Agricultural Research And Extension (NCARE)

LV – Latvian Academy of Agricultural and Forestry Sciences (LAAFS)

LV – State Education Development Agency (VIAA)

NO – Research Council of Norway (RCN)

PL – National Science Centre (NCN)

SI – Ministry of Education, Science and Sport (MIZS)

ES – Centre for the Development of Industrial Technology (CDTI)

ES – Ministry of Economy and Competitiveness (MINECO)

SE – Swedish Energy Agency (SWEA)

SE – Swedish Governmental Agency for Innovation Systems (VINNOVA)

SE – Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS)

CH – Federal Department of Economic Affairs, Education and Research (DEA)

CH – Federal Department of the Environment, Transport, Energy and Communications (DETEC)

TN – Institution of Agricultural Research and Higher Education (IRESA)

TR – Scientific and Technological Research Council of Turkey (TUBITAK)

- **ForestValue on CORDIS**
- **ForestValue on ERA-LEARN**

Two joint transnational calls (JC 2017 and JC 2021)

Within ForestValue, two transnational joint calls were launched. The first, co-funded by the EC, in 2017 and the second, without EC "top-up" funding, in 2021. The projects co-funded through both calls are presented in more detail in the section below – "Presentations of projects funded under ForestValue joint calls".

2.6.1. About ForestValue

Johan Elvnert, Secretary General, Forest-Based Sector Technology Platform

Photo: J. Elvnert personal archive

ForestValue have always had a clear focus on the needs and challenges of the forest-based bioeconomy and managed to combine a practical and open approach with high ambitions. For more than half a decade, the team of national and regional funding agencies in the ForestValue project have launched several trans-national calls of significant relevance for both researchers and businesses. The result speak for itself – several dozen R&I projects have been launched and they have contributed to a more competitive and more sustainable forest-based sector in Europe.

ForestValue has also acted as a stepping stone from the regional or national level, helping local actors to team up and aim towards the often more complex EU level. This is something unique that the stakeholders of the Forest-Based Sector Technology Platform (FTP) have greatly appreciated.

I would like to personally thank the team behind the success of the ForestValue project for all their incredible efforts and excellent work. Let the spirit of ForestValue live on – hopefully in new European-wide initiatives!

Photo: ©ForestValue 2022

3. Presentations of projects funded under ForestValue joint calls

The aim of ForestValue is to comprise the joint implementation of a transnational call for proposals for research, development and innovation in the forest-based sector with a clear financial commitment from the participating national and regional research programmes and the EU.

As in the preceding ERA-NETs, ForestValue was to provide, through its close links to national programmes, a fast, easy and simple way to set up transnational projects. The principles of variable geometry (the call focusing on different topics and including different sets of funding organisations) have been tested already in earlier calls and under ForestValue continued to be an integrative part of effective co-operation.

ForestValue seminar participants visiting Oodi, 23. 5. 2019, Photo: Mika Kallio

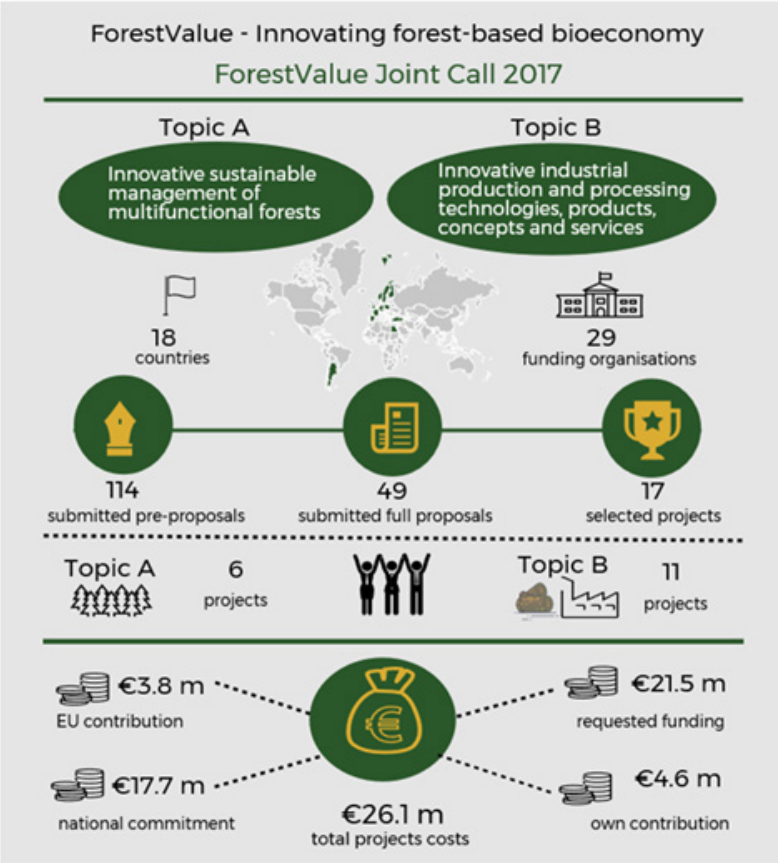
3.1. ForestValue Joint Call 2017 (JC 2017)

The call opened on 17 October 2017 and closed on 23 January 2018.

The first ForestValue joint transnational call for proposals for research, development and innovation in the forest-based sector was funded with financial commitments from the participating national and regional research programmes and the European Union. The overarching aim of the call was to support projects that addressed the development and proof of concepts on novel strategies, methods, processes or products designed to support the forestry and forest-based industries, including their respective partners, resellers, consumers and end-users in remaining competitive and efficient providers of sustainable bio-products and services.

In the 2-step submission process of the call, 102 eligible pre-proposals were peer reviewed and ranked by a panel of international experts. Based on the ranking and the available national/regional funding, 50 research consortia were invited to submit a full proposal. After peer review and ranking of the full proposals, again by a panel of international experts, the Call Steering Committee selected 17 research consortia for funding, within the limits of available national/regional funding including EU co-funding.

For facts and figures of the ForestValue Joint Call 2017, please see the infographic below.



AVATAR – Advanced Virtual Aptitude and Training Application in Real Time

Coordinator:
Dirk Jaeger, Georg-August Universität Göttingen, Germany
dirk.jaeger (at) uni-goettingen.de

Other partners: NO, SE

Project duration: 03/2019–10/2022

Project objective:
The objective of the AVATAR project was to develop an assistance and coaching system for forest machine operators to increase operational efficiency and perceived job satisfaction in mechanised timber harvesting while reducing mental workload. Through this, the project should contribute to efficiency improvements of CTL operations for enhanced timber utilisation at higher value-added resource recovery, alongside occupational health and safety, and thus support the implementation of a sustainable and competitive bio-economy in Europe.

Project website: **link**

Twitter: **link**

Project presentation at ForestValue kick-off seminar 23-24 May 2019: **pdf**

Stakeholder Article 1 AVATAR – Exploring harvester operators' need for feedback

Stakeholder Article 2 AVATAR – Real time follow-up of the precision of the harvesters' diameter sensing

Stakeholder Article 3 AVATAR – Automatic detection of work elements of forestry machines

Stakeholder Article 4 AVATAR – Demonstration of real-time sensor-based decision support for forest machine operators

Stakeholder Article 5 AVATAR – Boom tip control: Mere comfort or skill booster?

Stakeholder Article 6 AVATAR – Operator assistance systems and their suitability for improving efficiency of highly mechanized timber harvesting systems

CLICKdesign – Delivering fingertip knowledge to enable service life performance specification of wood

Coordinator:
Ed Suttie, Building Research Establishment (BRE), United Kingdom

Other partners: DE, FI, FR, NO, SE, SI, CA

Project duration: 03/2019–06/2022

Project objective:
CLICKdesign will develop a performance-based specification protocol to enable provision of a software tool for architects and specifiers to embed service life performance specification for wood.

Project website: **link**

Twitter: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

DynaTTB – Dynamic Response of Tall Timber Buildings under Service Load

Coordinator:
Marie Johansson, RISE Research Institutes of Sweden, Sweden
marie.johansson (at) ri.se

Other partners: FR, NO, SE, SI, UK

Project duration: 03/2019–10/2022

Project objective:
The overall objective is to identify experimentally a number of full-scale tall timber building (TTB) structures within Europe and, based on these results, develop representative finite element (FE) models for predicting the vibration response of TTBs exposed to wind-induced dynamic loading.

Project website: **link**

LinkedIn: **link**

ResearchGate: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

Stakeholder Article 1 explaining about first results

FIRENWOOD – Improved fire design of engineered wood systems in buildings

Coordinator:
Tian Li, RISE Fire Research, Norway

Other partners: CH, DE, EE, SE

Project duration: 04/2019–09/2022

Project objective:
The main project goal is to ensure a fire-safe use of innovative, engineered wood systems in taller and larger buildings by providing (i) improved fire design models, validated by small- and full-scale fire tests, and (ii) classification and test methods for adhesives with regard to elevated temperatures and fire. The main focus will be the effect of structural joints and adhesives in cross-laminated timber (CLT), glue-laminated timber (GLT) and wood-based I-joists.

Project website: **link**

ResearchGate: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

Stakeholder Article_1_FIRENWOOD – Medium- and large-scale fire tests

Stakeholder_Article_2_FIRENWOOD – Final workshop

Stakeholder_Article_3_FIRENWOOD – Engineered wood and fire from research to practice

FunEnzFibres – From fundamentals to valorization: Enzymatic oxidation of cellulosic fibres and underlying mechanisms

Coordinator:
Kristiina Kruus, VTT Technical Research Centre of Finland Ltd, Finland

Other partners: AT, NO

Project duration: 02/2019–05/2022

Project objective: This project will explore the potential of lytic polysaccharide monooxygenases (LPMOs) in oxidative modification of cellulosic fibres. The research aims at developing sustainable refining and dissolving processes.

Project website: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

Stakeholder Article 1 FunEnzFibres – Boosting enzymatic fibre processing: efficient production of celluloseoxidizing enzymes in Trichoderma reesei

Stakeholder Article 2 FunEnzFibres – Detailed characterization of enzymatically treated cellulosic fibres

GreenLane – Fast-tracking value and resilience for industrial wood supply

Coordinator:
Dag Fjeld, Norwegian Institute of Bioeconomy Research (NIBIO), Norway

Other partners: AT, SE

Project duration: 04/2019–12/2021

Project objective:
The overall goal of the project is to develop a virtual supply chain laboratory environment enabling value-tracking and interactive testing of harvesting and transport responses to challenging climate scenarios. The focus is on implementing weather-driven models for wood quality and availability.

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

Stakeholder Article 1 GreenLane – GreenLane stakeholder workshops – approaches for testing, development and dissemination

Stakeholder Article 2 GreenLane – GreenLane RBC – developing digital solutions for monitoring forest road availability in real-time

Stakeholder Article 3 GreenLane – GreenLane IBM – enhanced value tracking in supply chain simulation

hardwood_joint

hardwood_joint – Innovative joints in hardwoods

Coordinator:
Carmen Sandhaas, Karlsruhe Institute of Technology / Timber Structures and Building Construction (KIT), Germany

Other partners: AT, FR, SE

Project duration: 02/2019–10/2022

Project objective:
The overall project objective is to foster high-performance hardwood structures in the European building sector by developing economic, reliable and innovative joint technologies for hardwood members and

the design thereof. The objective is to pave the way for using more hardwood products in the building industry by giving added value to hardwood species which are currently mainly used as fuelwood.

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

Stakeholder Article 1 hardwood_joint – Joints with staples and nails

Stakeholder Article 2 hardwood_joint – Joints with axially loaded screws; long-term investigations

Stakeholder Article 3 hardwood_joint – Joints with laterally loaded fasteners

Stakeholder Article 4 hardwood_joint – Joints with shallow grooves

Stakeholder Article 5 hardwood_joint – Modelling of joints

I-MAESTRO – Innovative forest MAnagEment STRategies for a resilient bioecOnomy under climate change and disturbances

Coordinator:
Patrick Vallet, National Research Institute of Science and Technology for Environment and Agriculture (IRSTEA), France

Other partners: DE, FR, PL, SI

Project duration: 05/2019–10/2022

Project objective:
The main aim of I-MAESTRO is to improve the scientific basis for developing management strategies that increase resilience of the bioeconomy to future natural disturbances and climate change, while also maintaining a high level of wood production, carbon storage and habitat quality for biodiversity.

Project website: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

InFutUReWood – Innovative Design for the Future – Use and Reuse of Wood (Building) Components

Coordinator:
Karin Sandberg, RISE Research Institutes of Sweden, Sweden

Other partners: ES, DE, FI, IE, SI, UK

Project duration: 03/2019–02/2022

Project objective:
The project focuses on the reuse of current reclaimed wood in the circular economy as structural material but also on creating a "design for deconstruction" for future building. The main objective is to develop a method for ensuring future possibility of circulation of timber products with true consideration of whole life-cycle and practical industry issues at design, construction and deconstruction phases.

Project website: **link**

Project YouTube channel: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

Stakeholder Article 1 InFutUReWood – Explaining the project's overall aim

Stakeholder Article 2 InFutUReWood – Describes what is being done in WP5: properties of the recovered wood and grading of secondary timber for structural use

Stakeholder Article 3 InFutUReWood – Studying the demolition process of buildings

Stakeholder Article 4 InFutUReWood – Design for deconstruction and reuse (DfDR) of timber structures: Looking forward

InnoCrossLam – Innovative Solutions for Cross Laminated Timber Structures

Coordinator:
Boris Azinović, Slovenian National Building and Civil Engineering Institute (ZAG), Slovenia

Other partners: AT, DE, ES, SE

Project duration: 03/2019–09/2022

Project objective:
InnoCrossLam aims at increasing even further the competitiveness of cross laminated timber (CLT) as a versatile engineered product by increasing its predictability in demanding design situations not covered by

the guidelines of today or codes and standards foreseeable in the near future. In addition, the project will further develop a previously suggested (proof-of-concept) multi-functional use of CLT in terms of its thermal activation.

Project website: **link**

Twitter: **link**

LinkedIn: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

Stakeholder Article 1 InnoCrossLam – Presenting the first year progress

Stakeholder Article 2 InnoCrossLam – Innovative multifunctional CLT

Stakeholder Article 3 InnoCrossLam – Experimental and numerical investigations of CLT

MultiForest – Management for multifunctionality in European forests in the era of bioeconomy

Coordinator:
Mikko Mönkkönen, University of Jyväskylä, Finland

Other partners: AT, DE, NO, SE

Project duration: 04/2019–10/2022

Project objective:
This project aims to provide novel insights into forest policy, forest management and land-use planning by quantitatively analysing impacts of policies and management practices and developing large scale forest programmes that can simultaneously maintain or increase timber production and ensure the sustainability and resilience of multi-functionality in forests.

Project website: **link**

ResearchGate: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

MultiForest final policy recommendations: Better policies and management for sustainability transformations: How can expectations for forests be met?

MULTIFOREVER – Towards intensification of conifer production through multi-varietal forestry based on somatic embryogenesis

Coordinator:
Andrea Rupps, HUB – Humboldt-Universität zu Berlin – Institut für Biologie, Germany

Other partners: AR, DE, ES, FI, FR, SE

Project duration: 04/2019–06/2022

Project objective:
The project's ambition is to apply novel approaches to clone a genotype not only from juvenile, but also from mature tissues and to develop a value-added chain and joint strategy to bring high-quality somatic trees at acceptable costs towards multi-varietal forestry (MVF) of economically relevant conifers (pine, spruce, larch, Douglas-fir).

Project website: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf** or animated in **YouTube**

Stakeholder Article 1 MULTIFOREVER – Multi-varietal plantation forestry of conifers as chance for the future?

Stakeholder Article 2 MULTIFOREVER – Somatic seedlings at field as the first cross-European perspective for conifer multi-varietal forestry

Stakeholder Article 3 MULTIFOREVER – Presenting scientific news to an interested public and legislative powers that show solutions for forests of the future

NOBEL – Novel business models and mechanisms for the sustainable supply of and payment for forest ecosystem services

Coordinator:
Harald Vacik, University of Natural Resources and Life Sciences Vienna, Austria

Other partners: DE, ES, FR, NO, PT, SE

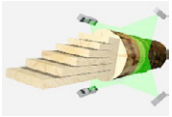
Project duration: 02/2019–09/2022

Project objective:
The objectives of the project are (i) to develop business models and mechanisms to internalise the socio-economic value of forest ecosystems, (ii) combine public policy tools with business models for implementing payments for forest ecosystem services (FES) at multiple

levels, and (iii) demonstrate and compare alternative approaches for payments in case studies in Europe.

Project website: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**



READiStrength – Resource-Efficient And Data-driven integrated log and board Strength grading

Coordinator:
Olof Broman, Luleå University of Technology, Sweden

Other partners: AT, DE

Project duration: 01/2019–03/2022

Project objective:
Making use of the latest technological developments in round timber scanning, the project READiStrength aims to improve the current concept of sawn timber strength grading towards earlier, more flexible and adaptive approaches prior to conversion at the raw material stage to make the best use of Europe's wood resources.

Project website: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

READiStrength publication – "Big Data" in der Festigkeitssortierung, full article in German **here**, English summary available in **ResearchGate**.

SMALLWOOD – Small diameter wood utilization with innovative stand management for multifunctional forests and a growing sustainable bio-economy

Coordinator:
Tomas Nordfjell, Swedish University of Agricultural Sciences (SLU) / Department of Forest Biomaterials and Technology, Sweden

Other partners: ES, FI, SI

Project duration: 02/2019–06/2022

Project objective:
The overall objective is to develop and evaluate new technologies and business and operational models that can support a sustainable management and utilisation of different types of small diameter wood

and further boost new SMEs and work opportunities in particular in rural areas.

Project website: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

SMALLWOOD promotional videos, subtitles in five languages: **link**

Stakeholder Article 1 SMALLWOOD – Cost analysis of thinning and supply systems for small diameter trees

Stakeholder Article 2 SMALLWOOD – Capitalizing HEI potentital usability – Stakeholder workshops

Stakeholder Article 3 SMALLWOOD – Sustainability and value creation rating

For more reports and infosheets, please see **SMALLWOOD website**

StrongComposite – A novel material concept for high strength cellulose composites

Coordinator:
Ingo Burgert, ETH Zurich, Switzerland

Other partners: AT, FI, SE

Project duration: 02/2019–05/2022

Project objective:
This project will explore invention originating from a material concept, which unifies delignification and densification of wood while retaining the beneficial fibre directionality, thus enabling a "green" high performance product. One of the technological objectives is to develop and upscale such industrial processes that enable large enough prototype geometries for the addressed fields of application.

Project website: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

Stakeholder Article_1_StrongComposite – Biomimetics in Wood Adhesives

Stakeholder_Article_2_StrongComposite – High-Strength Cellulose Composites

Stakeholder_Article_3_StrongComposite – Delignified Wood-Gelatin Composites

ValoFor
ForestValue

ValoFor – Small Forests – Big Players: Valorising small scale forestry for a bio-based economy

Coordinator:
Silvio Schueler, Austrian Research Centre for Forests (BFW), Austria

Other partners: DE, FI, SE, SI

Project duration: 12/2018–09/2022

Project objective:
The objective of ValoFor is to understand the contribution of small forest owners in the transition to a wood based bioeconomy by considering the perception and management strategies of small forest owners. This includes analysing and comparing forest management strategies with respect to potential timber supply, ecosystem services and forest resilience in climate change.

Project website: **link**

ResearchGate: **link**

Twitter: **link**

Project presentation at ForestValue kick-off seminar, 23–24 May 2019: **pdf**

3.1.1. Horizon Results Booster (HRB)

Horizon Results Booster (HRB) is an initiative of the European Commission which aims to bring a continual stream of innovation to the market and maximise the impact of public funded research within the EU. It supports projects eager to go beyond their dissemination and exploitation (D&E) obligations, steering research towards strong societal impact and concretising the value of research and innovation (R&I) activity for societal challenges.

To achieve this, HRB, in a 4 years period from July 2020 to June 2024, offers free consulting services to closed or ongoing research projects funded by FP7, Horizon 2020 or Horizon Europe programmes.

The ForestValue gorup, made up of the ForestValue ERA-Net Cofund and most of the research projects funded under the ForestValue Joint Call 2017 (JC 2017) have successfully applied for two HRB services:

- **Identifying and creating the portfolio of research & innovation project results (module A),**
- **Creating the portfolio of results; design and execute a portfolio dissemination plan (module B)**

The catalogue of results, promotional video, promotional flyer and policy brief are briefly summarised below.

Catalogue of Results (JC2017)

Cutting-Edge Forest Technologies and Management Solutions

The projects under the Project Group on **Cutting-Edge Forest Technologies and Management Solutions** (HRB PDESB FORESTVALUE) have received support from the Horizon Results Booster (HRB) an initiative funded European Commission, Directorate General for Research and Innovation, Unit J5, Common Service for Horizon 2020 Information and Data.

European forestry faces a number of challenges, from lack of resource efficiency and modernisation to decline in available skills and human resources in the sector, not to mention the need to ensure minimal environmental impact. As a key sector which provides rural jobs and affects other industries, innovative tools and thinking is needed to ensure the sustainability of European forest resources moving forward.

The project group on **Cutting-Edge Forest Technologies and Management Solutions** forms the projects of the ForestValue ERA-NET Cofund initiative. They have brought out innovative solutions for the

sustainable management of multifunctional forests along with innovative industrial production and processing technologies, products, concepts and services.

If you are a player in the forestry sector, then browse through the catalogue of results and see how you can benefit!

Catalogue Promotional Video

A separate **Catalogue Promotional Flyer** is available in PDF **here**.

All together, these projects bring forward the following:

- New processes for producing wood products
- Better understanding of the properties of wood and technologies for its analysis
- New techniques and technologies to support the valuation and valorisation of forests and wood
- An understanding the players in the wood economy from the grassroots and introducing methodologies and tools to improve their performance
- Research on the effects of policy on the wood economy and providing insights for improvement
- New or improved wood products for industrial application
- Methodologies and tools to improve wood economy performance
- Techniques and technologies to support the valuation and valorisation of forests and wood

Catalogue of Results

The projects have produced 49 results that are organised into the following categories:

- High-Value Added Wood Products
- Wood Grading Solutions & Technologies
- Wood Construction Material Innovations and Guidelines
- Forest Management and Logistics Solutions
- Policy Reports and Recommendations
- Wood Material Research and Insights Library

Forestry players are encouraged to browse through the catalogue and get in touch with the result owners to see how these results can be beneficial for further use.

Policy Brief (JC2017)

Increasing sustainability and resilience of European forests and related value chains – challenges and solutions in time of climate change

A **policy brief** based on the results from ForestValue projects

Executive Summary

ForestValue – Innovating forest-based bioeconomy (ForestValue) is a public–public partnership under the Horizon 2020 Framework Programme established to promote increased innovation and competitiveness of the forest-based sector in Europe and to support its transformation from a resource-intensive to a knowledge-based, productive, resource-efficient and resilient sector.

In the policy brief, we draw from a set of insights and lessons learnt that are based on recent ForestValue projects around innovative sustainable management of multifunctional forests and innovative industrial production and processing technologies, products, concepts and services. The main solutions offered from the projects range from (among others) forest management and logistics solutions to wood construction material innovations and guidelines. All this aims to contribute to addressing ongoing challenges in Europe around maintaining and increasing the sustainability and resilience of European forests and related value chains in times of climate change.

The contributors represent a multidisciplinary set of scholars, researchers and practitioners involved in either implementing forest-based solutions, researching forest policy and governance, or finding technological solutions to support forestry and forest-based industries in remaining competitive and efficient providers of sustainable bio-products and services.

One of the main challenges identified in this policy brief is that of intensifying collaboration between different stakeholders at both EU and national levels in order to achieve the ambitious goals of the Green Deal and decarbonise the European economy. The policy brief addresses this issue, providing dedicated recommendations across multiple policy levels (regional funders to pan-EU regulations) that highlight the need for

- better understanding of the challenges that are facing forest owners and operators, particularly the marginalised or smaller owners, and providing insights on how they can be supported,
- understanding of the latest technologies, methodologies and processes that should be encouraged for implementation or viewed positively for funding, and
- understanding the actual impacts of climate change to European forests and how this affects the wood economy.

The policy brief was elaborated within the context of the Horizon Results Booster, funded under Horizon 2020, and the recommendations are based upon the results of the 12 projects participating in the HRB services (NOBEL, MultiForest, ValoFor, I-Maestro, MULTIFOREVER, FIRENWOOD, CLICKdesign, ReadiStrength, InFutUReWood, DynaTTB, InnoCrossLam, AVATAR).

Photo: ©ForestValue 2022

3.1.2. Combined impact

The ForestValue monograph underscores significant strides in sustainable forestry and industrial innovation.

Efforts in multifunctional forest management focused on adaptive strategies that balance wood production with critical ecosystem services such as biodiversity preservation, carbon sequestration, and recreational uses. Key projects emphasized remote sensing, precision forestry, and biodiversity assessments to tailor management practices to local conditions.

In industrial contexts, advancements included the development of energy-efficient processing methods, bio-based alternatives to fossil materials, and circular economy principles. Collaboration among researchers, industries, and policymakers was pivotal, promoting knowledge transfer and aligning innovation with sustainability goals. For details, see the full monograph.

A synthesis view of the main results from the projects is the basis for future service definition and stakeholder mapping.
Key Exploitable Results can be grouped:

- High-Value Added Wood Products
- Wood Grading Solutions & Technologies
- Wood Construction Material Innovations and Guidelines
- Forest Management and Logistics Solutions
- Wood Material Research and Insights Library

The combined results contribute significantly to advancing sustainable management of multifunctional forests and industrial production technologies in several interconnected ways. These achievements align with the goals of enhancing forest sustainability, promoting innovative industrial practices, and ensuring ecosystem service provision.

1. Advancing Sustainable Forest Management

The results provide tools, methodologies, and insights that directly enhance sustainable practices in forestry:

- **Forest Ecosystem Understanding:**
  - *MULTIFOREVER's* advancements in somatic embryogenesis introduce innovative breeding and cloning techniques, allowing targeted propagation of elite trees for resilience and productivity.
  - *ValoFor's* models and datasets offer data on forest growth, harvest outputs, and ecosystem service trade-offs under various climate

and management scenarios. These insights allow adaptive forest management strategies.

- *I-MAESTRO's* forest simulation models integrate climate change, disturbance, and management scenarios to ensure forest ecosystem resilience.

- **Biodiversity and Climate Resilience:**
  - Techniques like *stress memory in trees* (*MULTIFOREVER*) allow forests to adapt to environmental stressors, promoting resilience.
  - Data from *ValoFor* highlights ecosystem service dynamics, helping manage biodiversity while optimizing economic outputs.

- **Market Integration and Economic Viability:**
  - Tools like *NOBEL's auctioning platform* foster economic incentives for ecosystem services, encouraging sustainable forest practices.
  - Analysis of small forest enterprise production (ValoFor) sheds light on profitability challenges, driving policy and practice improvements.

2. Innovation in Industrial Production and Processing Technologies

Results support sustainable industrial production by reducing resource intensity, enabling efficient utilization of wood, and promoting advanced material development:

- **Efficient Resource Utilization:**
  - *FunEnzFibres* enzymatic oxidation processes and analytical tools enable high-value cellulose fibres and micro-fibrillated materials with reduced energy and water consumption.
  - *SMALLWOOD* innovations in harvesting techniques improve the sustainable use of small-diameter wood, ensuring minimal waste.

- **Advanced Material Development:**
  - *StrongComposite* delivers high-strength cellulose-based composites to replace less eco-friendly materials in packaging and construction, offering lightweight, durable, and sustainable alternatives.
  - *InnoCrossLam* innovations enhance the design and structural integrity of cross-laminated timber (CLT), particularly for challenging applications like seismic zones.

- **Data-Driven Design and Manufacturing:**
  - Tools like *READiStrength's grading models* and *FIRENWOOD's fire design systems* empower industries to optimize wood grading, strength prediction, and fire resistance, improving material efficiency and safety.

3. Combining Multifunctionality with Industrial Innovation

Many projects bridge the gap between ecological management and industrial needs:

- ***MULTIFOREVER*'s** somatic embryogenesis outputs contribute to both sustainable forestry and industrial demand for high-quality wood.
- ***DynaTTB*'s** insights into tall timber buildings promote the use of wood in urban construction, reducing reliance on non-renewable materials while validating its performance under structural loads.
- ***FunEnzFibres*** advances cellulose fibre technologies for textiles and packaging, integrating forestry outputs into the circular economy.

4. Cross-Cutting Impacts

The results collectively enable:

- **Reduction in Environmental Impact**: Techniques like enzymatic oxidation and advanced harvesting reduce energy and resource use, minimizing forestry and industrial footprints.
- **Increased Sustainability Across Supply Chains**: From sustainable forest sourcing (*MULTIFOREVER*, *ValoFor*) to eco-friendly end-products (*FunEnzFibres*, *StrongComposite*), the projects advance the entire wood-based value chain.
- **Enhanced Stakeholder Engagement**: Tools like *MultiForest's optimization tool* and *NOBEL's auction platform* provide frameworks for balancing stakeholder demands, fostering collaboration across sectors.

Conclusion

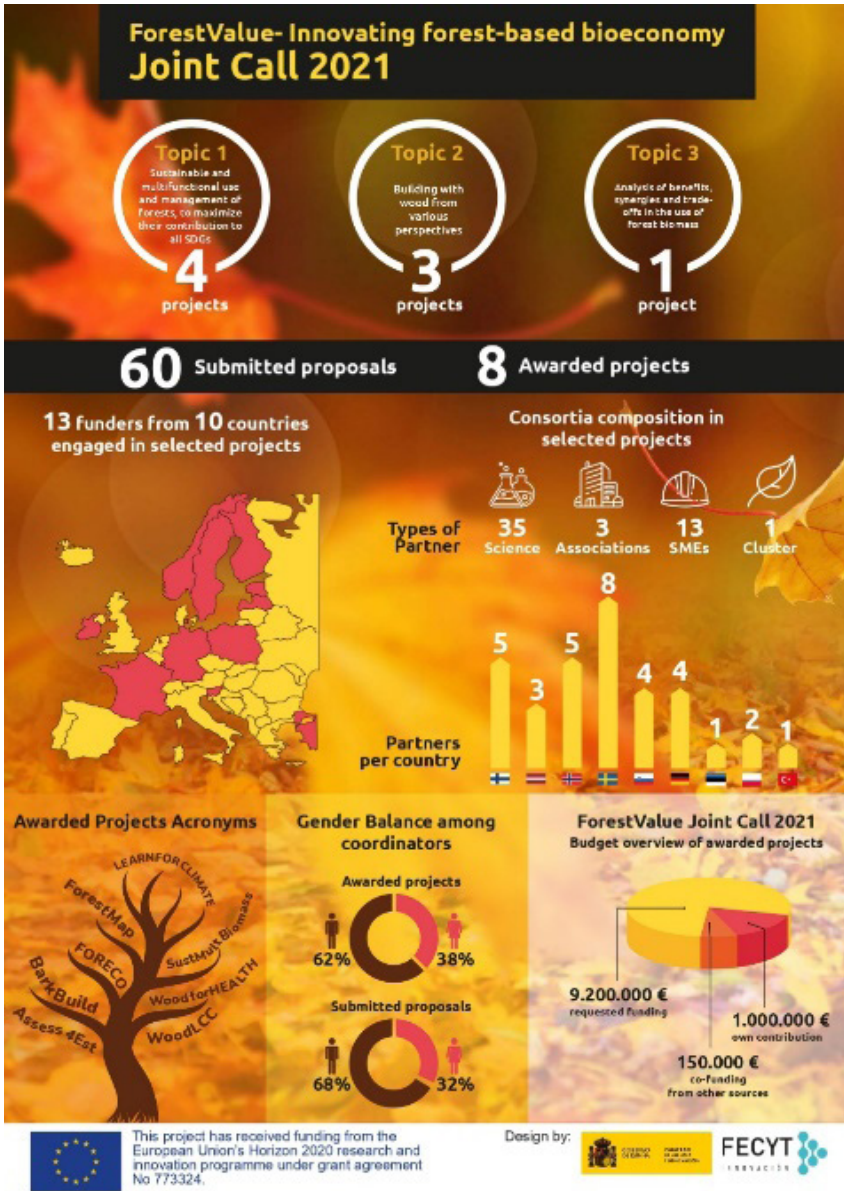
These innovations together form a robust framework that connects sustainable forest management with industrial processing and production advancements. They contribute to the circular economy, reduce reliance on non-renewable resources, and promote the multifunctionality of forests, addressing ecological, social, and industrial goals simultaneously.

3.2. **ForestValue Joint Call 2021 (JC 2021)**

The second call for joint European research projects under the ForestValue Research Programme has an indicative total public funding budget of over EUR 11 million. The call for proposals opened on 19 January 2021 and closed on 13 April 2021.

The overarching aim of this joint transnational call is to support projects that will produce knowledge to promote the best possible use of forests and forest resources for the benefit of society on its way to a climate-neutral circular economy and sustainable society.

For facts and figures of the ForestValue Joint Call 2021, please see the infographic below.



ForestValue JC 2021 funded projects presentations

Assess4Est – Seeing trees and forests for the future: Assessment of trade-offs and potentials to breed and manage forests to meet sustainability goals

Coordinator:
Katri Kärkkäinen, Natural Resources Institute Finland (Luke), Finland

Other partners: LV, NO, SE

Duration: 2022–2025

Project objective:
Assess4EST will use novel genomic breeding tools and introduce new features to national growth and yield simulators to assess possibilities to combine sustainability goals in forest management by studying the impacts of genetic variation in the regeneration methods: even-aged planting with advanced generation improved material vs. natural regeneration in even- and uneven-aged stands. The project will concentrate on assessing traits important for sustainability goals: growth, increasing resilience and adaptability of forests to rapid climate change, as well as wood quality suitable for products that store carbon and substitute more emission-intensive and non-renewable products.

Project presentation at ForestValue final conference, 28–29 September 2022: **pdf**

BarkBuild – Tree bark as a renewable source of wood protection materials for building applications

Coordinator:
Mika Sipponen, Stockholm University (SU), Sweden

Other partners: FI, LV, NO, PL, SI

Duration: 2022–2025

Project objective:
BarkBuild will tackle the societal challenge of climate change by developing new, long-lasting wood building materials with low environmental impact that will replace products having a larger carbon footprint and poor environmental soundness. The primary research objective of the BarkBuild project is to develop new bark-based wood protection and building formulations and demonstrate their technical performance, safety and sustainability in wood impregnation, coating, and polymer composites in outdoor and indoor use.

Project website: **link**

Project presentation at ForestValue final conference, 28–29 September 2022: **pdf**

FORECO – The role of forest recovery from biotic and abiotic threats for risk resilient management

Coordinator:
Anja Rammig, Technical University of Munich (TUM), Germany

Other partners: SE, SI

Duration: 2022–2025

Project objective:
The aim of FORECO is to provide tools for identifying and operationalising sustainable and multifunctional forest use and management strategies which simultaneously consider ecological and economic risks arising from biotic and abiotic threats in the coming decades (i.e. drought, storms and bark beetles) and take into account forest recovery from disturbances. In close collaboration with local, national and EU-level stakeholders, the project will identify needs of forest practitioners, advisors and policymakers for evidence to inform adaptation strategies in the face of increasing vulnerability of forests and uncertainty about the future.

Project presentation at ForestValue final conference, 28–29 September 2022: **pdf**

ForestMap – The next generation of forest maps – Adapting a Nordic success story across the globe

Coordinator:
Johan Fransson, Swedish University of Agricultural Sciences (SLU), Sweden

Other partners: FI, TR

Duration: 2022–2025

Project objective:
The overall objective of ForestMap is to advance the societal values of forest use by developing and evaluating a new methodology to produce forest maps across the globe. The forest maps will be produced using crowd sourced data from smartphones and remote sensing data from space- and airborne systems. Artificial intelligence (AI) algorithms will be developed in order to produce forest maps tailor-made to stakeholders' needs and corresponding with their ability to pay. The societal value of the forest maps used in existing and new business models will also be explored.

Project presentation at ForestValue final conference, 28–29 September 2022: **pdf**

LEARNFORCLIMATE – Learning to realise multiple forest policy objectives under climate related stress and disturbance

Coordinator:
Karin Beland-Lindahl, Luleå University of Technology (LTU), Sweden

Other partners: DE, PL, SI

Duration: 2022–2025 (to be confirmed)

Project objective:
LEARNFORCLIMATE will address the urgent need to implement the Sustainable Development Goals (SDGs) by promoting multifunctional management of forests in times of rapid socio-ecological change. The aim is to support learning that enables concurrent achievement of multiple forest related SDGs and EU objectives while responding to the constraining – and enabling – roles of climate change-related stress and disturbances.

Project website: **link**

Project presentation at ForestValue final conference, 28–29 September 2022: **pdf**

SustMultBiomass – Sustainable and multifunctional use of forest biomass

Coordinator:
Tord Snäll, Swedish University of Agricultural Sciences (SLU), Sweden

Other partners: FI, NO

Duration: 2022–2025

Project objective:
SustMultBiomass aims to identify pathways of sustainable future forest management that develop the bioeconomy and multifunctional forests that will contribute to mitigating climate change, delivering non-woody forest ecosystem services (FES) and preserving biodiversity. The project will do this based on extensive analyses of synergies and trade-offs of alternative uses of forest biomass for the coming 30 and 100 years. The approach is to simulate a large number of forest management alternatives into the future and then apply multi-objective optimisation (MOO) to identify the future pathways that fulfil objectives to be specified for the forest.

Project website: **link**

Project presentation at ForestValue final conference, 28–29 September 2022: **pdf**

WOODforHEALTH – Promoting safe and extended use of wood products in health buildings through development of antimicrobial surfaces, hygiene concepts and guidelines

Coordinator:
Vesa Virtanen, University of Oulu, Finland

Other partners: DE, LV, NO, SE

Duration: 2022–2025

Project objective: WOODforHEALTH will promote safe and increased use of wood products through the development of antimicrobial surfaces and hygiene concepts and by providing the first extensive guidelines for the use of wood in healthcare buildings. This will be in response to demands from both the construction industry and investors and owners of healthcare buildings. The research team will explore the limits and potentials for wood products in healthcare buildings with an emphasis on surface aspects and use this exercise to develop guidelines. The aim of WOODforHEALTH is to meet these requirements with wood products whose uncoated and coated surfaces are holistically characterised for their technical, environmental and economic performance.

Project website: **link**

Project presentation at ForestValue final conference, 28–29 September 2022: **pdf**

WoodLCC – Enhanced life-cycle costing in wood construction by novel methods for service life planning

Coordinator:
Christian Brischke, University of Göttingen (Uni-Göttingen), Germany

Other partners: EE, NO, SE, SI

Duration: 2022–2025

Project objective: The overall objective of WoodLCC is to enable robust and precise life-cycle costing (LCC) based on input from novel models for detailed service life performance specification for wooden components and buildings. The project will take full advantage of results from novel methods for detailed service life performance specification established through extensive research over the last years on dose/response functions for exterior wood elements. The novelty of WoodLCC is to optimise the input data for LCC for wood-based building products.

Project website: **link**

Project presentation at ForestValue final conference, 28–29 September 2022: **pdf**

4. 20 years of strategic evolution in transnational RTDI funding

The European forest-based research area (ERA): A nourishing DNA[1] of skills and knowledge

Homo Silvestris Europae[2] /
Dr Andreas Nikolas Kleinschmidt von Lengefeld

Photo: Dr A. N. Kleinschmit von Lengefeld personal archive

Europe maintains a sophisticated research area (ERA) for the forest-based sector that enables breakthroughs in research, produces innovation, and facilitates change in operations and performances covering all value. The impact of at least seven important ERA instruments on the forest-based sector has been significant thanks to successful collaboration among public authorities, RTDI providers and industries since the turn of the millennium. More an evolution than an iterative process, ERA convinces and engages stakeholder groups across Europe and the Mediterranean basin and reaches out to international partners from other continents.

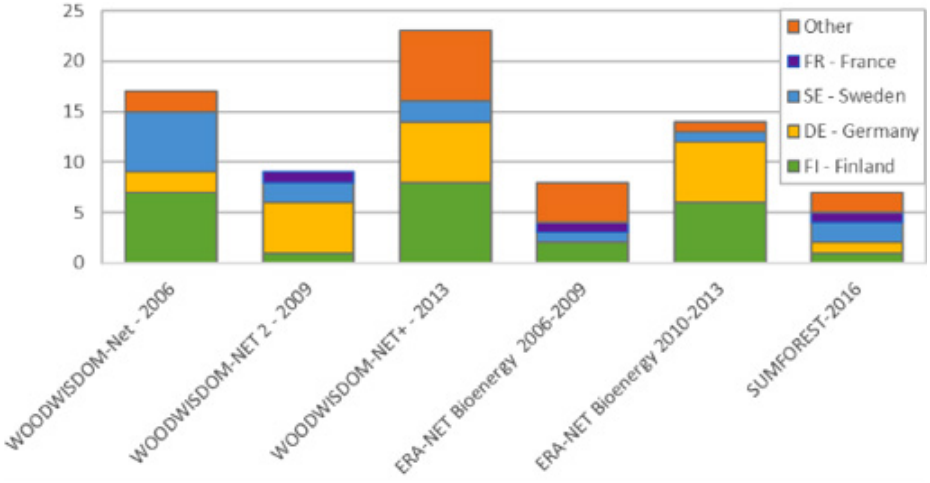


Figure 1: Assessment of ERA-NETs and COST Actions in the EU Forest-Based Sector – coordinating countries

NB: Foresterra was coordinated by Spain

1 DNA is a synonym for the "triple-helix cooperation" between public authorities, industry, and research/academia.

2 https://homo-silvestris-europae.com

Chronicle

The ERA instruments grew in a new European environment for innovation and research. In 2005 the European forest-based sector cooperatively launched its first Vision Document covering all value chains. Based upon this document, a European Strategic Research Agenda (SRA) was produced, involving National Support Groups from 24 EU members plus Norway and Switzerland.

The first European SRA was launched in spring 2006, followed by many National Research Agenda (NRAs) with a special focus on the needs of the sector in the respective countries.

Part of the evolution is the strong willingness to address actual needs of the various value chains, prioritise them and endorse transnational collaboration for delivering knowledge-based solutions. It is a smart approach by a group of pioneering partners from countries[3], where the forest-based sector plays a vital role for the society and the economy. The nature of such a collaboration helps to enlarge the group by inviting and involving more partners. It allows flexibility in taking current developments and results into account.

Some particularities underline the importance of transnational innovation and research programmes, which can be illustrated by one good example: based upon a common Mediterranean strategic research agenda (MFRA), the creation of a regional cooperation (Foresterra[4]) allowed a focus on the Mediterranean basin and its bordering countries, where forest ecosystems are composed of 50 per cent endemic species ferociously menaced by climate change effects more than ever before. Forestry is particularly connected more to food than to round wood production in this region (nuts, olives, etc.). The transnational collaboration focuses on highly relevant forest ecosystem matters to safeguard resilience and biodiversity.

All ERA-NET instruments led to a unique network of public authorities, which experienced good cooperation and which could facilitate outreach of their national stakeholders to collaborate on the right scale level in projects with accessible expertise from other fields of knowledge.

Since 2004 the European forest-based sector has joined all important value chains to create a technology platform[5] for research and innovation with the objective of enhancing private investment in RTDI activities and becoming a strong part of the knowledge-based bio-economy (KBBE) [see "Chronicle" box].

Readers of this concise article are invited to learn about the excellent achievements and breakthroughs in technological development by means of the portfolio of funded projects covering all value chains under the ERA-NET instruments and the EC Framework programmes on their respective homepages and in the communications of their seminars and conferences. You can start finding detailed information and links under **https://forestvalue.org/links/**.

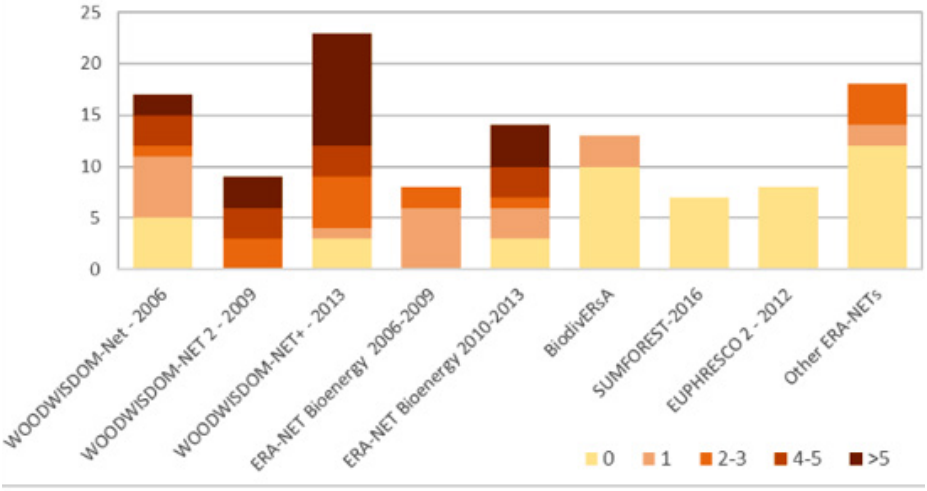
3 2018: Dr Andreas Nikolaus Kleinschmit von Lengefeld and Dr Uwe Kies.

4 http://www.foresterra.eu

5 https://www.forestplatform.org

The European forest-based sector and the role of RTDI

The European forest-based sector is home to small and medium-sized companies, predominantly located in rural areas and therefore of high importance for their development, employment and sustainable growth. Even though only a very small number of industry partners incorporate own RTDI units, the forest-based sector is highly innovative and driven by expertise and knowledge. The majority are SMEs operating in established regional markets with an interest in the European and international ones.



* Note: Project counts are categorized according to the number of industrial partners per project.

Figure 2: ERA-NET projects with industrial participants per call

Note: Foresterra funded two projects with no industrial participation; these focused on urgent forest ecosystem-related matters.

The various ERA-Net instruments opened many-fold pathways among the different value chains to adapt to customer needs and to address societal demands. To mention just one of the good examples, value-added, high-performing wood construction elements and materials are being developed for at least 20–30 years to change construction processes and allow architects, designers, and engineers to create smart, energy-efficient and beautiful buildings and habitats. Even if some parts of the first transformation industries do not carry out their own research or development, it is of the utmost importance that they have access to collaborative projects to address their actual needs and to produce tailor-made solution in a short timeframe.

These days the four European macro-regions (North-Baltic, Central-West, Central-East and South-Mediterranean) are composed of high-performing forest industries under the circular bioeconomy concept as a green engine for sustainable growth.[6] The role of innovations, technological developments, skills and research is growing, specifically in relation to tackling and combating climate change effects on the sector, which is a provider of solutions.

6 https://woodcircus.eu/index.php/publications/

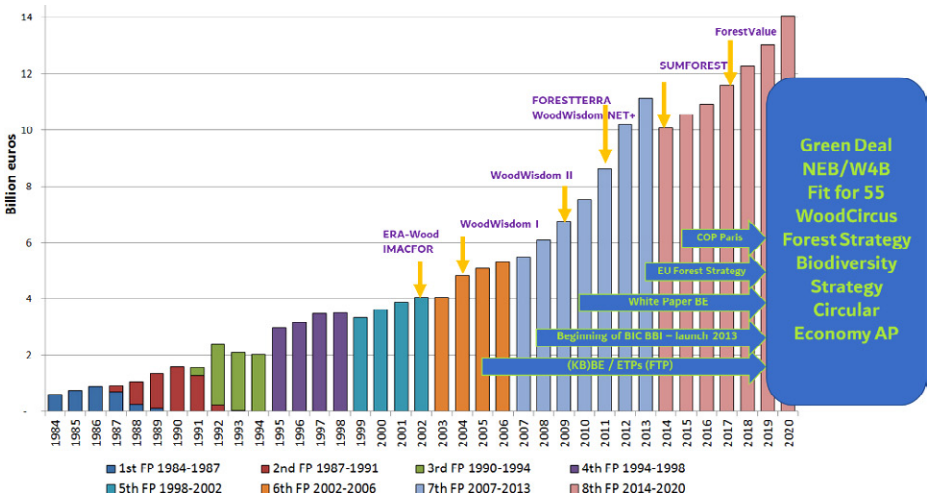


Figure 3: European RTDI programmes 1984–2020; source: SBFI

Europe is focusing on expertise and collaboration to address societal challenges.

From the 1980s onwards, Europe has invested increasingly huge efforts in developing knowledge and in boosting research and innovation to address societal challenges. A paradigm shift evolved with the creation of the European Union in 1992 (Maastrich Treaty). The level of public funds for research and innovation has been growing exponentially and is structured into inter- and transdisciplinary thematic priorities with a focus on urgent economic, environmental and societal needs. The tempo of changes in our economies and societies and also in our ecosystems is driven by a set of numerous factors, a few of which are outlined below. Each underlines the importance of knowledge, skills, research and innovation, and collaborations to face them:

1. **Climate change**
   The last six years were the hottest in Europe (and globally) since the beginning of monitoring weather. Scientific evidence shows that human activities accelerate climate change. There is an urgent need to understand its drivers and effects and how to tackle them. Green and blue ecosystems are the most affected, as are urban communities, as climate change impacts all aspects of our daily life (heatwaves, droughts, etc.). Understanding that our world is connected and that all actions are interlinked requires new approaches to join forces and global alliances. To tackle the impacts best, there is a need to predict and build the right scenarios for developing strategies and actions. The forest-based sector plays a vital role, starting from forest sources via the sustainable use of wood in all kinds of products incorporating the circular economy concept to provide green, sustainable solutions.

2. **Pandemia**
   The COVID-19 pandemic put societies on hold on a global level as never seen before. The impacts on society, the environment and the economy will still be noticed in the coming decades. But science and research are the game changer! In the shortest time, vaccination that protects and safes lives has been produced on a large scale and made accessible to all age groups. Though it attracts less attention today, the boomer generation had already been affected by a global pandemic,

that of HIV, which hit the world at the beginning of the 1980s, causing a death toll of approximately 36 million people. The recognition of this fact in the Western world diminishes nowadays as intense research led to breakthroughs and high-quality treatments for those who have access to medication. It is no death sentence anymore, but still the HIV+ population is estimated to be around 40 million people worldwide.

3. **Business changes**
   There is an increasing awareness of environmental and societal concerns, which are related to the urbanisation process, the development of a service economy, the increase of higher education and the mobility of people in the last 40 years. More than 90% of European citizen live in urbans areas. Globalisation enhances the mobility of people to work abroad and to be more flexible (e.g. business nomads and ex-pats). Digitalisation offers people to work remotely from practically any place around the world if they have a good internet connection. Many companies started operating like this already during the lockdown periods of the COVID-19 pandemic and could safeguard their performance.

4. **Social media and societal movements**
   For good and for bad, social media connects people around the world (if they have access to a free internet). Everything seems to be just “one click away” and this raises a new awareness of global connections, impacts and a broader vision of how there is only one planet. Social media is a new instrument to boost matters and to impact society. One good example is the #me-too initiative, which revealed problems in systems that permitted abuse of power. It hit society and stopped neglecting the facts and evidence.

5. **Gender-related matters**
   The important role of women and girls in equal, resilient societies, economies and democracies is winning more and more attention at all levels. A diverse society, as is seen in many studies, is more resilient towards menaces by natural disasters or geopolitical threads. But this requires new models for sharing responsibility, sharing care work and becoming inclusive to benefit from contributions, knowledge and skills on all levels.

This limited selection of drivers for societal, economic and environment changes should illustrate and endorse the fact that good research, collaboration and focus lead to transformation and impacts.

The author[7] identifies himself as a crown witness to the strategic development of the European research area for the forest-based sector. His career track incorporates many transnational cooperations: ERA-Wood project coordinator, the setting-up of the Forest-Based Sector Technology Platform (FTP) (Director), collaborator and initiator of and in many ERA-NET instruments, public–private partnerships (PPPs) on a European scale, and co-author of relevant white papers.

This article focuses concisely on the European policies and societal developments that set the framework conditions for the forest-based sector, but his career is strongly dedicated to innovations, technological developments and strengthening the competitiveness of forest products as well as sustainable forestry and adaptation to climate change. He was director for innovation and research at an institute of technology (operating around 150 projects a year) for more than 10 years and has been employed by industry and strategic consulting companies throughout his professional life for over 25 years. Since 2021 he has owned and run a strategic consulting company dedicated to the forest-based sector in Paris.

Photo: ©ForestValue 2022

7 https://www.linkedin.com/in/andreas-nikolaus-kleinschmit-von-lengefeld-91a2612a/

5. A way forward

5.1. The new forest partnership – Reflections from a funding agency

Dr Karin Perhans

Photo: Dr K. Perhans personal archive

The societal challenges we are currently facing are far too complex for any single country to develop the solutions required. Only when the issues are tackled from the contexts and perspectives of many different countries will the development of the foundation of knowledge be sufficiently broad and widely applicable.

Forests and forestry constitute exactly such a complex area, where the generation of the knowledge needed for a sustainable progression requires a broad collaboration. The area touches on several more clearly related policy areas, such as climate mitigation and adaptation, rural and industrial development, and the safeguarding of biodiversity, but also on more subtle ones like social justice and human wellbeing. To be able to truly push the development forward in a sustainable direction, we will be needing each other's experiences, skill sets and diverse views.

Thus the work towards a European partnership on forests and forestry is a promising avenue towards such a broad platform for collaboration on today's and tomorrow's knowledge needs. Compared to the more fragmented landscape with a multitude of ERA-Nets and parallel initiatives predecessing the partnership, it has a number of key advantages.

First, from the applicants' perspective there will be fewer initiatives to keep track of and possibilities to stay up to date with. The well-known and (for the most part) smooth and efficient funding model with the national funding agencies being the main contact points for their respective applicants will continue, while the array and diversity of different activities launched and offered will be broader. Looking at the first wave of partnerships already up and running, these activities might include

efforts such as knowledge platforms and support mechanisms for science to effectively reach policy. The partnerships may also constitute a much needed bridge to facilitate global cooperation outside of the EU.

Second, from the funding agencies' perspective, although admittedly the partnerships already launched have shown that a substantial amount of resources will need to be devoted from a partner agency to wholeheartedly engage in a partnership, they still constitute a concentration of strength and focus. The longer-term predictability and foresight built into the functioning of a partnership is an important advantage both internally at the agency and in the external dialogue and engagement with the national research and stakeholder community.

Third, also from the perspective of advancing the development of key research policy issues, the partnerships are a key arena. These issues can include guidelines and policies for the development of an open research system that rewards quality and a good and inclusive research culture or responsible assessment procedures that contribute to the renewal of the merit and assessment system that is currently taking place globally. By also providing a platform for the development and continuous testing and refining of international research policy processes, a partnership can be an arena for mutual learning and contribute to strengthening the quality also of our national funding processes.

Finally, for the complex societal challenges connected to forests and forestry, going forward will require collaboration between a broad range of actors using a wide set of approaches. Compared to previous initiatives, the partnership will be based on a jointly developed research and innovation agenda. This agenda will form the backbone of the partnership and all its efforts. It will be broad enough to encompass all important aspects of the field but focused enough to provide a basis for priorities and for achieving impact.

So, from a funder's perspective, I look forward to a prospective partnership on forests and forestry with great enthusiasm and pleasure.

5.2. ForestValue – Continuing the ERA-NET success story in the forest-based sector

Mika Kallio, ForestValue ERA-Net Cofund and ForestValue2 CSA project coordinator

Photo: M. Kallio personal archive

The ERA-NET Cofund Action "ForestValue – Innovating forest-based bioeconomy" was started on 1 October 2017. It was then announced that "the aim of ForestValue is to comprise the joint implementation of a trans-national call for proposals for research, development and innovation in the forest-based sector with a clear financial commitment from the participating national (or regional) research programmes and the EU" and with the help of all stakeholders we did succeed in this; actually, we even exceeded expectations by having two trans-national calls successfully launched.

But let us not forget that this is not just a single Horizon Europe project but part of series of steps in the process of building up a European-wide partnership for the forest-based sector. This European success story we are writing was initiated back in 2004, when we started with the very first ERA-NET in the forest-based sector, called "Networking and Integration of National Programmes in the Area of Wood Material Science and Engineering", better known as WoodWisdom-Net. After 6 individual ERA-NET projects and 8 joint calls with total investments of more than EUR 100 million, we can definitely say that we have made an impact, and this on various levels.

The future

In 2019, the Member States and their research funding organisations decided to propose **a co-funded European Research and Innovation Partnership on Forests and Forestry**. This was also highlighted in the EU Forest Strategy for 2030, which calls for a research and innovation partnership on forestry *"to overcome the fragmentation of public research efforts in the EU and to reinforce work on research priorities that call for a stronger coordination"*.

After various discussions and negotiations, today we are in the situation that the actual process of applying for a European Partnership on Forests and Forestry is coordinated by the Standing Committee on Agricultural Research Strategic Working Group on Forests and Forestry Research and Innovation (**SCAR FOREST**). In parallel, a Strategic Research and Innovation Agenda and roadmap is being developed via a consultation process run under a four-year Horizon Europe project **EUFORE** (European Forest Research and Innovation Ecosystem), a Research and Innovation Action coordinated by the European Forest Institute EFI. If all the

preparations towards the partnership are successful, we can expect that it could get started during the first year of the second Horizon Europe Strategic Plan for 2025–2027.

What is especially good news for the research community in a shorter perspective is that on 1 January 2023 we have started with another new 5-year Horizon Europe project, **ForestValue2**, coordinated by the Ministry of Agriculture and Forestry of Finland. As the name already implies, it is a continuation of ForestValue, aiming at implementing at least one joint call for RDI proposals, this call dedicated to the forest-based sector.

It is all about networking

Since the first ERA-NET in the forest-based sector, the results have made it evident: collaboration is key to successful teams and projects. Today, ForestValue2 and EUFORE continue networking different stakeholders.

ForestValue2 is implementing a set of "other joint actions", such as summer schools and breakfast clubs for early-stage researchers and industry, the activities focusing on identifying networks and fostering exchanges with existing and new collaborations with EU13 and Ukraine and Moldova. Furthermore, ForestValue2 intends to organise workshops/webinars/"scientific cafés" for the general public to meet researchers and experts to discuss scientific topics and ongoing and future projects.

EUFORE will establish a co-creative environment for stakeholders to improve the overall coordination of the sector's R&I activities at the regional, national and European levels. The project is aiming at setting up a stakeholder engagement hub which will enable a space for dialogue with stakeholders and policymakers.

This is all to create a solid collaborative basis for a prosperous future European Research and Innovation Partnership on Forests and Forestry.

Photo: ©ForestValue 2022

Photo: ForestValue Kick-off meeting, Brussels, 13. 1. 2017 (ForestValue archive)

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