

BenchValue - Benchmarking the sustainability performances of value chains

CONTEXT

Europe aspires to create a thriving bioeconomy. For this, new product value chains are needed. However, an increased uptake of bio-based products requires that they are economic and more sustainable than competitive products. This needs to be assessed scientifically with internationally accepted and comprehensive sustainability assessments, covering aspects relevant to decision makers.

A promising tool for cross-sector value chain comparison of economic, environmental and social impacts is the Tool for Sustainability Impact Assessment (ToSIA). This project expands ToSIA with indicators for benchmarking of wood material value chains against mineral and other non-renewable value chains.

MAIN OBJECTIVES

The BenchValue project aims at developing a versatile benchmarking method to:

- 1) compare renewable wood-based and non-renewable value chains
- 2) quantify the sustainability impacts and climate change mitigation potential of substituting non-renewable with wood-based materials to support decision makers in policy and market environment. The construction sector was chosen to test the BenchValue method, as timber can be a viable and long-term alternative for storing renewable carbon in buildings and substituting greenhouse gas emissions from more energy intensive materials. BenchValue has case studies in Ireland, France, Lithuania, and Austria.

MAIN ACTIVITIES

- WP1 COORDINATION: Project coordination and communication of project results
- WP2 ANALYSIS: Gap analysis of current ToSIA software and methods, as basis for the development in WP3. This analysis includes a literature study as well as stakeholder interaction
- WP3 METHOD: Development of a benchmarking method with ToSIA
- WP4 CASES STUDIES: Proof of concept demonstrated at 4 country-specific typical case studies, with strong stakeholder involvement throughout the project. It includes capacity building through international practical knowledge exchange
- WP5 SYNTHESIS: Recommendations how to improve assessment methods and definition of baselines and scenarios to quantify current and possible future contribution of wood construction (potential) to the bioeconomy. These recommendations are based on the case studies and country-specific results.



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European Forest Institute, Finland (Coordinator)

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National University of Ireland, Galway, Ireland
IVL Swedish Environmental Research Institute, Sweden
University of Limerick, Ireland
University of Limoges, France
University of Natural Resources and Life Sciences, Austria

DURATION

01-2017 to 11-2019

TOTAL GRANT

€ 1 572 663

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Sumforest Projects (call 2016, topic 1)

Forexclim - Forests and extreme weather events: solutions for risk resilient management in a changing climate

CONTEXT

Climate change and in particular extreme weather events require the development of risk-resilient forest management strategies across Europe. In the proposed project, we investigate the interactions between extreme weather (heat waves, drought, storm), subsequent forest susceptibility to fire and pathogens, market developments, forest management and related uncertainties to determine on how current forest management strategies should be adapted to sustain risk-resilient multifunctional forest landscapes in the future. In close collaboration with stakeholders, we develop a model-based strategy for identifying and operationalizing risk resilient forest management regimes. We evaluate the risk of extreme events-induced forest damage and impacts on forest ecosystem services for the most important European forest types. We derive alternative climate change-robust management strategies by means of advanced coupled modelling approaches.

MAIN OBJECTIVES

The aim of our project is to provide strategies for identifying and operationalizing risk resilient forest management regimes, which simultaneously consider ecological and economic risks arising from extreme weather events.

The main research questions of FOREXCLIM are:

- What is the risk of extreme weather event-induced forest damage in Europe and what ecological and financial impacts will extreme weather events have on European forests in the coming decades?
- How should current forest management regimes in Europe be adapted to make stand structures and tree species composition portfolios robust to the impacts of extreme weather events?
- How does uncertainty about future climate, timber market prices and forest ecosystem functioning under changed climate influence optimal forest management regimes?

MAIN ACTIVITIES

We derive alternative climate change-robust management strategies by means of advanced coupled modelling approaches. The core of our methodological approach is a process-based forest ecosystem model coupled with a multi-objective, risk-sensitive optimization for robust forest functioning and ES provisioning. The goal is to derive the optimal forest management under changing climate and timber markets. Our assessment will provide optimal silvicultural management regimes for integrated management of forests, i.e. fulfilling multiple ES provision goals. These results will serve as a basis for the development of guidelines for alternative, adapted management strategies at a local and regional scale. Through strong stakeholder involvement in all stages from co-designing of the methodological approach to discussion of findings, the project will enhance the science-policy-practice interface.



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PARTNERS

Technical University of Munich, Germany (Coordinator)

Lund University, Sweden

European Forest Institute, regional office, France

University of Ljubljana, Slovenia

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DURATION

03-2017 to 02-2020

TOTAL GRANT

€ 697 223

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Sumforest Projects (call 2016, topic 2)

ForRISK - Forest density reduction to minimize the vulnerability of Norway spruce and silver fir to extreme drought – a risk assessment

CONTEXT

Climate change may profoundly impact the structure and functioning of forest ecosystems. Reducing stand basal area is a suggested forest management strategy that may provide climate adaptation in the short-term, before active adaptation approaches more suited to future climates will be considered. However, when developing adaptation strategies, the economic implications and efficiency of the proposed strategies have to be assessed and taken into account to support decision making under uncertainty within forest management. Therefore, within sustainable management, a proper risk management is crucial, especially when climatic framework conditions are changing.

MAIN OBJECTIVES

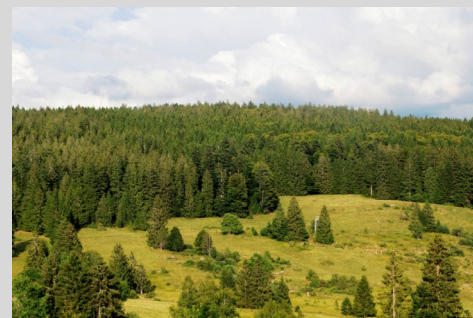
ForRISK aims at examining the interacting effects of drought and forest management on tree growth and ecophysiological mechanisms. The results will be integrated into an economic risk assessment, providing a powerful framework for adapting central European forest ecosystems to increased drought intensity. Specifically, ForRISK will:

- focus on Norway spruce and silver fir, two of the most economically and ecologically important tree species in Europe. ForRISK will capitalize on forest stands in Germany, France, and Switzerland
- analyze growth trends, ecophysiological mechanisms, and drought vulnerability of forests in relation to specific values of stand basal area
- assess how to better adapt forests to drought risks, based on risk assessment and economic evaluation of management approaches
- elaborate management options, and discuss adaptation of guidelines with the local stakeholders.

MAIN ACTIVITIES

To reach its goals, ForRISK will:

- analyze tree- and stand-level growth responses in relation to drought and management via tree-ring analyses and historical inventory measurements
- investigate intra-annual ecophysiological processes and mechanisms during and after drought via isotope analyses
- provide a mechanistic ecosystem model for Norway spruce and silver fir, including detailed descriptions of the drought reactions of the two species
- quantify the effect of different management treatments to reduce drought vulnerability using a classical risk management approach, focusing on economic risk assessment and risk evaluation
- provide optimized drought adaptation strategies, considering climate change uncertainties
- engage the well-established stakeholder networks of the project partners to reach forest practitioners in Switzerland, France, and Germany to disseminate project results.



© Alessandra Bottero ; Norway spruce - silver fir

PARTNERS

Swiss Federal Research Institute WSL, Switzerland (Coordinator)
French National Institute for Agricultural Research INRA, France
Albert-Ludwigs-University ALUFR, Germany
Forest Research Institute of Baden-Württemberg FVA, Germany
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DURATION

03-2017 to 02-2020

TOTAL GRANT

€ 660 000

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Sumforest Projects (call 2016, topic 2)

FutureBioEcon - Sustainable future of European Forests for developing the bioeconomy

CONTEXT

Products and energy based on fossil material contribute to the global warming. Sustainable consumption of Bio-based products and bio-based energy are two ways to reduce global emissions. EU Member States therefore work on a transition from a fossil- to a bio-based economy. This transition requires an increase in the extraction of bio-based materials from nature, such as wood from the forest. However, the forest also provides many other services to society. It sequesters carbon from the atmosphere and therefore reduces the greenhouse effect, it produces berries that we can eat, and it is important to the wellbeing of people. The forest is also home to numerous species and the main reason why many of them are red-listed is modern forestry.

MAIN OBJECTIVES

The objective of this project is to devise sustainable ways to achieve European and national policies and practice in bioeconomy. We will assess how forest management should be modified when targeting alternative timber qualities and increasing flows of wood products while contributing to EU goals on climate change mitigation, ecosystem services and biodiversity. We will test two alternative strategies that seek to maximize the climate mitigation benefit while increasing the flow of biomass products: (i) optimal allocation of the biomass for different wood product categories, and (ii) optimal management planning. We will also perform an overall sustainability analysis to evaluate how the provision of biomasses and climate benefits can be reconciled with the maintenance of other ecosystem services and biodiversity in the long-term.

MAIN ACTIVITIES

We will formulate and simulate scenarios for land-use, forestry, ecosystem services and conservation from EU to national scales. This include:

- developing EU scenarios according to policies and market demands for EU and partner countries
- investigating effects of different forest values chains on climate change mitigation, adapting the EU wide scenarios to the policies of partner countries
- assessing impacts of different forest management and flows of wood products on Mediterranean forest fires
- assessing impacts of different forest management and levels of wood product extraction on the capacity of forest to contribute to climate change mitigation
- designing novel combinations of forest management and relative proportions of wood products that minimize the potential negative impacts of increasing harvest levels on the provision of non-woody ecosystem services and biodiversity.



© Daniel Burgas; Tree Retention

PARTNERS

Swedish University of Agricultural Sciences, Sweden (Coordinator)
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DURATION

04-2017 to 03-2020

TOTAL GRANT

€ 943 095

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Sumforest Projects (call 2016, topic 1)

POLYFORES - Decision-making Support for Forest Ecosystem Services in Europe – Value Assessment, Synergy Effects and Trade-Offs

CONTEXT

POLYFORES is an inter- and transdisciplinary project involving scientists from natural- and social sciences with strong expertise in the field of forest ecosystem services (FES) assessment and valuation. The project does not aim to repeat assessments of FES that have been conducted before. Instead POLYFORES maps existing approaches and makes use of results from former and on-going European research projects concerned with ecosystem services (ES).

MAIN OBJECTIVES

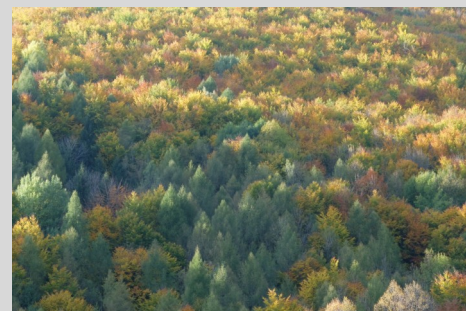
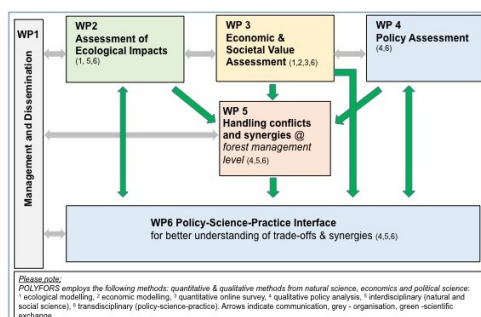
POLYFORES has three main aims, to:

- map ecological impacts including trade-offs and synergies between different FES of variable forest management scenarios at different spatial and temporal scales
- provide a holistic approach of value assessment taking into account different valuations across multiple levels of decision-making and diverse sectoral perspectives contributing to appraisal of trade-offs and synergies between different FES, and
- support decision-making processes of FES at different (Pan-European and EU, national and sub-national) levels through a transdisciplinary approach involving decision makers in a continuous participatory learning process level throughout the entire project.

MAIN ACTIVITIES

POLYFORES is organized in 6 workpackages (see figure) which together will evaluate 8 hypothesis. The project involve activities such as:

- evaluating methods for valuation of ES from an economic and ecologic perspective
- analyse how policies address FES identifying synergies and incoherencies in policy
- from comparative national case studies understand how national policies are implemented on local levels
- an interactivity science-policy-management support of FES decision-making through a collaborative learning process on EU level.



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PARTNERS

Swedish University of Agricultural Sciences, Sweden (Coordinator)

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Norwegian University of Life Sciences, Norway

Albert-Ludwigs-University Freiburg, Germany

University of Natural Resources and Life Sciences, Austria

Centre of Technologic Forestal de Catalunya, Spain

Centre for Forest Ecology and Productivity RAS, Russia

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DURATION

09-2017 to 12-2019

TOTAL GRANT

€ 1 677 000

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Sumforest Projects (call 2016, topic 3)

REFORCE - Resilience mechanisms for risk adapted forest management under climate change

CONTEXT

There is mounting evidence that climate change will have drastic impacts on European forests with degradation of both ecosystems functions and ecosystems services. In this context, there is an increasing interest in developing new management approaches fostering resilience. Such approaches should encompass the wide range of functions and services provided by forests, building on the concept of multifunctional forestry which is now widely implemented in European policy. Applying the concept of 'management for resilience' in the real world is however currently extremely rare, mainly because of the lack of a sound scientific understanding of forest resilience.

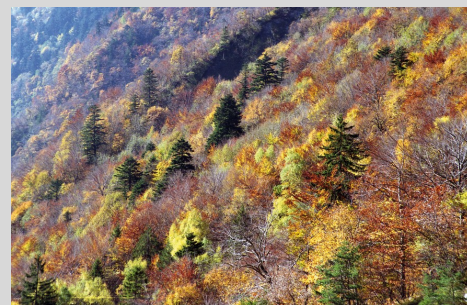
MAIN OBJECTIVES

The aim of REFORCE is to enhance the scientific basis for successfully managing forest resilience to climate change. To achieve this aim, REFORCE will produce a set of new products and knowledge related to ecological resilience (resistance and recovery) to disturbance (droughts, bark beetle, windstorms) using up-to-date remote sensing data, forest inventory data and forest dynamics models at stand and landscape scales. It will also pursue concrete links to socio-ecological forest resilience by exploring how the economic environment, specifically the development of virtual markets, affects the efficient exploitation of marketed and non-marketed ecosystem services, and by exploring decision variables such as the value of information or the perception of risk on the readiness of forest managers to adapt their management to foster resilience.

MAIN ACTIVITIES

REFORCE will:

- develop recommendations for operational forest resilience measures in multifunctional forestry
- map the resilience of forest productivity to climatic events across Europe and North-East Canada with remote sensing, and identify gradients of resilience within and between regions
- analyze ecological mechanisms of forest resilience that can be influenced by management on short- and long time-scales, with mechanistic and empirical models informed by monitoring data
- evaluate approaches to managing resilience, including the risk reduction potential of coordinated risk management in multi-owner landscapes using mechanistic forest models and economic analyses
- foster the implementation of resilience management by co-developing management alternatives with local stakeholders and by developing strategies for efficient communication between scientists and decision makers.



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Potsdam Institute for Climate Impact Research, Germany

University of Regensburg, Germany

Slovenian Forestry Institute, Slovenia

University of Natural Resources and Life Sciences, Austria

The University of Vigo, Spain

Swedish University of Agricultural Sciences, Sweden

Université de Sherbrooke, Canada

DURATION

03-2017 to 02-2020

TOTAL GRANT

€ 776 250

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Sumforest Projects (call 2016, topic 2)

REFORM - Mixed species forest management. *Lowering risk, increasing resilience*

CONTEXT

Forests are increasingly exposed to climate-driven biotic and abiotic disturbances. Climate change could thus jeopardize forests' capacity to deliver critical ecosystem services. There is therefore an urgent need to adapt forest management so as to promote and improve forest resilience at different spatial and temporal scales. Mixed forests are considered as one of the main options for adapting to and reducing risks of climate change. Higher tree species diversity is expected to provide higher productivity, temporal stability, resistance and resilience to disturbances and a more diverse portfolio of ecosystem services.

MAIN OBJECTIVES

This project primarily aims at increasing knowledge about the resistance and resilience of mixed forests to climate driven disturbances and providing the necessary information to improve the sustainable management of mixed forests in the context of climate change. In order to achieve this goal the main objectives are:

- determine the role of mixing species on reducing the vulnerability of forest stands to biotic and abiotic disturbances
- identify the management regimes to improve the resilience of mixed forests
- adapt growth models to simulate mixed forest dynamics under different climate scenarios
- analyse the effect of risk resilient forest management alternatives on the provision of ecosystem services (ES) in mixed forests at different spatio-temporal scales
- transfer the project results to stakeholders and policy makers.

MAIN ACTIVITIES

The main activities to achieve the REFORM aims are the following:

- comparison of pure vs. mixed stands vulnerability to multiple hazards through quantitative estimates of resistance and resilience; and analysis the stand features that reduce vulnerability
- analysis the effect of stand structure and thinning treatments on resilience; define risk resilient silvicultural guidelines; and implement risk resilient silvicultural alternatives in forest simulators
- estimate ES provision based on experimental data from stands with different levels of stand heterogeneity; and simulate the effect of risk resilient silvicultural alternatives on ES provision at different spatio-temporal scales
- create an Open Access Simulation Hub Service platform and organize regional workshops and training activities for communication with forest managers and policy makers and for the exploitation of results.



© REFORM project

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Université catholique de Louvain, Belgium

Centre national de la recherche scientifique, France

Latvian State forest Research Institute, Latvia

Aleksandras Stulginskis University, Lithuania

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University of Agriculture in Krakow, Poland

DURATION

04-2017 to 03-2020

TOTAL GRANT

€ 1 935 063

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Sumforest Projects (call 2016, topic 2)

Projects -List of funders

BenchValue

- Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (BMLFUW), Austria
- Ministry of Agriculture and Forestry (MMM), Finland (Coordinator)
- The French Environment and Energy Management Agency (ADEME), France
- Department of Agriculture, Food and the Marine (DAFM), Ireland
- Lietuvos Respublikos Aplinkos Ministerija (MERL), Lithuania
- Forskningsradet för Miljö, Areella Näringar och Samhällsbyggande (FORMAS), Sweden

Forexclim

- Bundesministerium für Ernährung und Landwirtschaft (BMEL), Germany (Coordinator)
- Ministry of Agriculture, Forestry and Food (MAAF), Slovenia
- Forskningsradet för Miljö, Areella Näringar och Samhällsbyggande (FORMAS), Sweden

ForRISK

- National Agency for Research (ANR), France
- Bundesministerium für Ernährung und Landwirtschaft (BMEL), Germany
- Federal Office for the Environment (FOEN), Switzerland (Coordinator)

FutureBioEcon

- Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (BMLFUW), Austria
- Ministry of Agriculture and Forestry (MMM), Finland
- Ministerio de Economía y Competitividad (MINECO), Spain
- Forskningsradet för Miljö, Areella Näringar och Samhällsbyggande (FORMAS), Sweden (Coordinator)

POLYFORES

- Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (BMLFUW), Austria
- National Academy of Science, Belarus
- Bundesministerium für Ernährung und Landwirtschaft (BMEL), Germany
- Norges Forskningsrad (RCN), Norway
- Ministerio de Economía y Competitividad (MINECO), Spain
- Forskningsradet för Miljö, Areella Näringar och Samhällsbyggande (FORMAS), Sweden (Coordinator)

REFORCE

- Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (BMLFUW), Austria
- Research Foundation Flanders (FWO), Belgium
- National Agency for Research (ANR), France
- Bundesministerium für Ernährung und Landwirtschaft (BMEL), Germany
- Ministerio de Economía y Competitividad (MINECO), Spain

REFORM

- Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (BMLFUW), Austria
- FNRS, Belgium
- National Agency for Research (ANR), France
- Bundesministerium für Ernährung und Landwirtschaft (BMEL), Germany
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- Ministry of Agriculture, Latvia
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