Agroforestry and Innovations in Europe: results from EIP-AGRI Operational Groups analysis in the context of FOREST4EU

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Multi-actor approach for forestry and agroforestry sector

FOREST4EU - European Innovation Partnership Network promoting Operational Groups dedicated to forestry and agroforestry - is a coordination and action support project financed by the Horizon Europe programme, which aims to link existing Operational Groups (OGs) in different European countries in order to foster the transfer of knowledge and good practices between experts in the field.

Forestry and agroforestry in the EU

Around Europe, there are hundreds of Operational Groups: small projects promoted by groups of farmers, forest managers and local communities.

They all share the same goal: advancing innovation and good practices in forestry and agroforestry sector.

However, OG results struggle in crossing national borders: innovations and best practices tend to remain in the local environment and do not reach the EU level.

Innovation Topic Hubs - ITHubs

FOREST4EU established 5 multi- actor EU cross-countries Innovation Topic Hubs (ITHubs) related to 5 identified topics in forestry and agroforestry sectors.

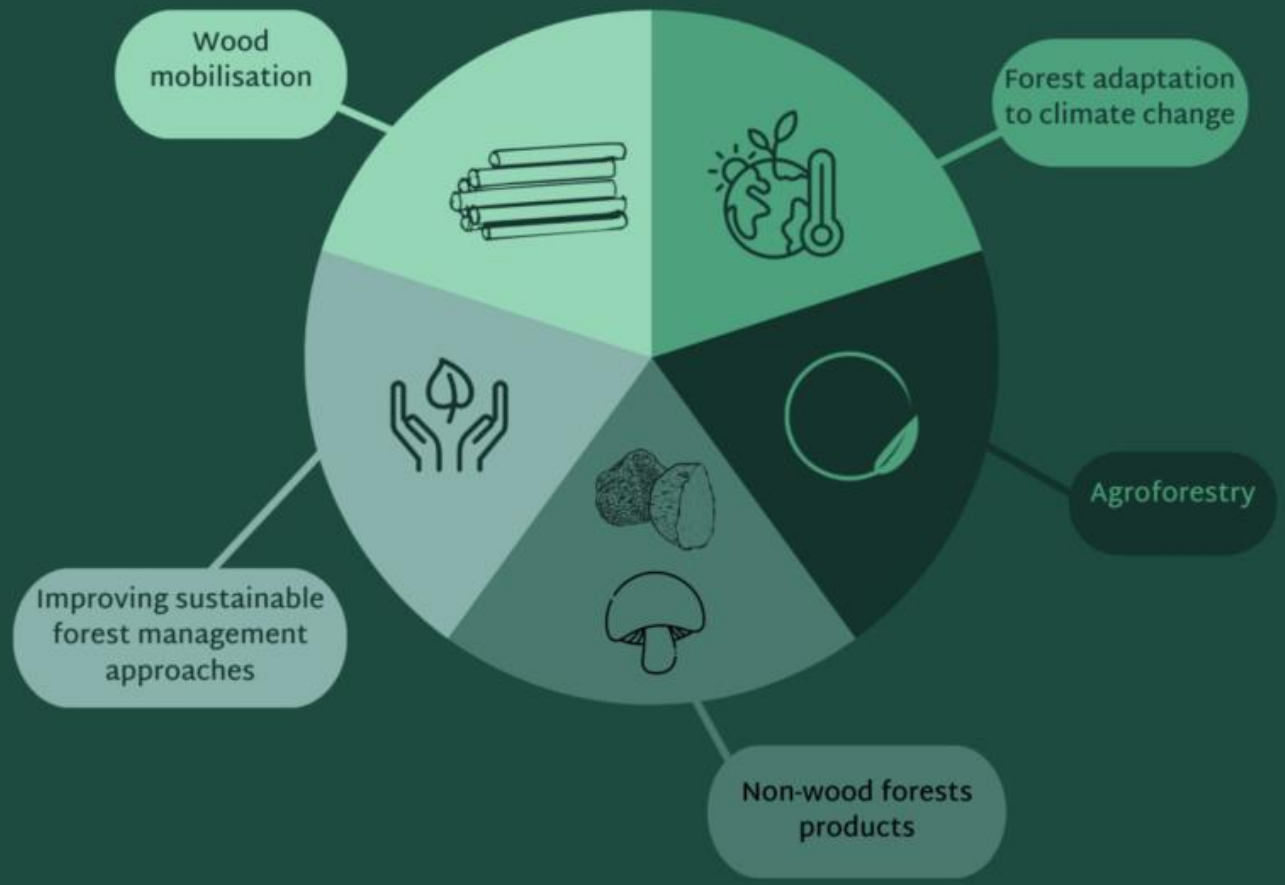
What is innovation?

Innovation is a new idea successfully implemented, then adopted and disseminated. Innovation can be based on new but also traditional practices in a new geographical or environmental context.

Types of innovation:

- Technological,
- Process,
- Product,
- Organisational,
- Social,
- Service.

Guidelines on programming for innovation and implementation of EIP for agricultural productivity and sustainability, (2013).

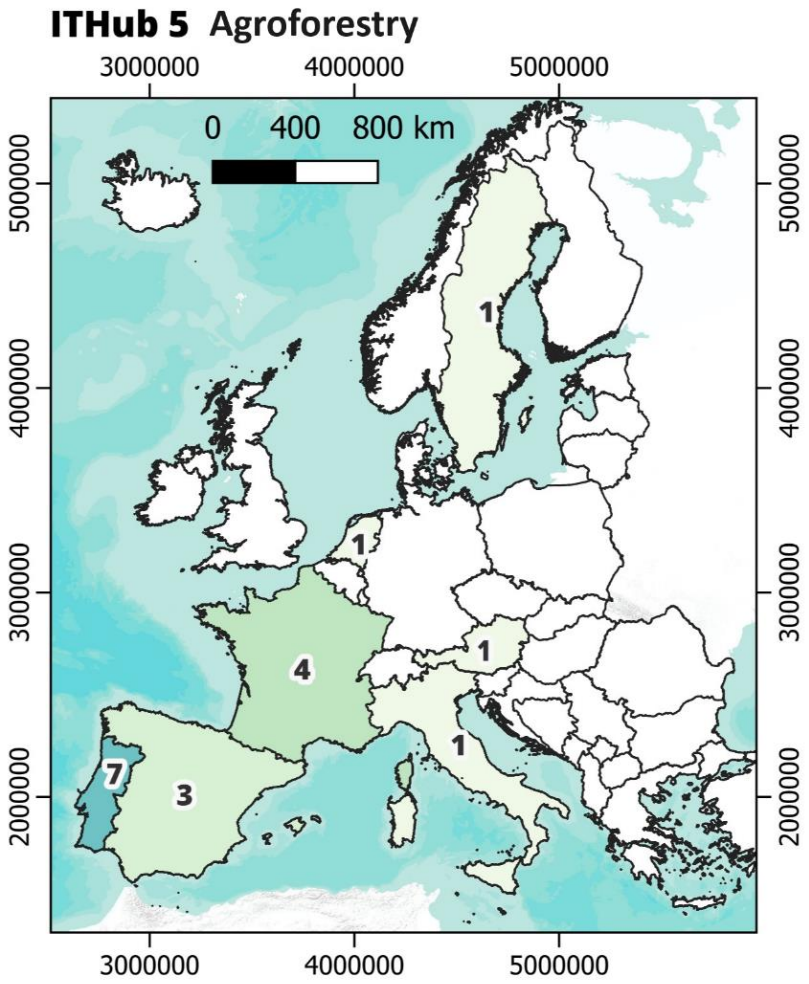


ITHub 5 - Agroforestry

Challenges & needs

- Soil conservation and regeneration;
- Climate change adaptation;
- Optimization of the relationship between agriculture and foresty;
- Tools for innovation uptake, including scientific knowledge and management techniques ready to be used by farmers;
- Increasing value in diversification of agro-forestry products;
- Find suitable business models to accomodate a multi-functional farm;
- Labor availability and management.

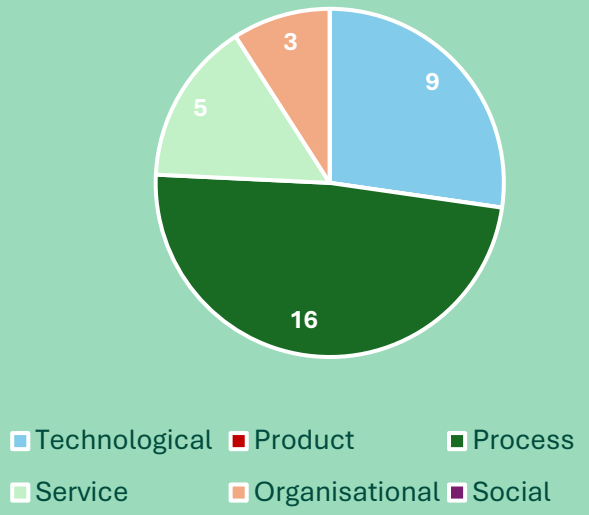
ITHub 5 - Agroforestry



18 Operational Groups

33 Extended Summaries

ITHub 5 Agroforestry - Innovations



Most used keywords
(n> 5,with decreasing frequency)

Agroforestry, soil management/functionality, remote sensing data, climate and climate change, agricultural production system, farming practices

Methodology for prioritizing innovations

The main aim of FOREST4EU **national prioritization workshops** has been to implement an open discussion with national experts and local stakeholders in order to identify:

- the most relevant innovations and good practices for the forestry/agroforestry sector,
- 3 most interesting OGs to visit (peer to peer learning),
- the best channels for disseminating capacity building material.

In 9 Project Countries, with the participation of a total of 191 stakeholders.

Community of practice (ITHub managers & NSPOC)

Invited experts

Invited stakeholders

33 Innovations → 20 Innovations → 10 Innovations → National Prioritization workshops → 5 Innovations + 3 OGs for study visits

ITHub 5 - Agroforestry

Prioritization national workshops – Data analysis

On the 45 selected innovations from 9 national prioritization workshops across the EU, we conducted a similarity analysis to make evidences on similarities and differences between Countries.

Most relevant agroforestry innovations across Europe

GO Experiment Agroforestry (The Netherlands)

A feasible step-by-step plan with practical guidelines and concrete designs to enable the application of agroforestry on farms

Service innovation

Selected by: Italy, Germany, Finland, Latvia, Slovenia

GO PS NEWTON (ItalY)

Criteria and indicators for the certification of the sustainable management of an agroforestry system PEFC

Process innovation

Selected by: Croatia, Finland, France, Slovenia.

GO Agroforst in Österreich (Austria)

Practitioner-oriented consulting for agroforestry systems in Austria

Service innovation

Selected by: Croatia, Germany, Finland, Slovenia.

GO SILVPAST (Portugal)

Review assesses the state of the art regarding the use of livestock for ecosystem management in Mediterranean landscapes

Process innovation

Selected by: Italy, France, Portugal, Spain.

ITHub 5 - Agroforestry

Challenges & needs

- Soil conservation and regeneration;
- ✓ Climate change adaptation;
- ✓ Optimization of the relationship between agriculture and foresty;
- ✓ Tools for innovation uptake, including scientific knowledge and management techniques ready to be used by farmers;
- ✓ Increasing value in diversification of agro-forestry products;
- ✓ Find suitable business models to accomodate a multi-functional farm;
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Discussion

- Common innovations have been selected across EU.
- These innovations aligns with ITHub challenges and needs.
- Innovations with general characteristics have been prioritised in numerous Countries, more practices-specific ones are targeted by specific Countries.
- Innovations in AF have been mainly developed in Mediterranean regions but there is increasing interest also in Continental regions.
- Most of the innovations selected are process innovations.
- The innovations prioritized are practical-oriented and focus on the enhancement of AF in farms, consultancy, and networking.
- Growing interest in developing new business models for agroforestry products.

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Thank you!

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DAGRI DIPARTIMENTO DI SCIENZE E TECNOLOGIE AGRARIE, ALIMENTARI, AMBIENTALI E FORESTALI

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INNOVATION TITLE	**A feasible step-by-step plan with practical guidelines and concrete designs to enable the application of agroforestry on farms**
OPERATIONAL GROUP	Proeftuin Agroforestry Noord-Holland (Experiment Agroforestry Noord-Holland)
COUNTRY	The Netherlands
INNOVATION TYPE	Service
KEYWORDS	Agricultural production system, Biodiversity and nature management, Supply chain, marketing and consumption, Farming / forestry competitiveness and diversification, agroforestry, carbon footprint
APPROACH AND MAIN RESULTS	Today, agroforestry systems are being (re)developed in the Netherlands with diverse business models, including recreation, education, and cooperative ventures. Choosing the right agroforestry system depends on factors like farm type, size, landscape, and the entrepreneur's interests and skills. Customization is essential, as one system may not fit all farms. The design process involves several steps: - Assess the current state of the farm and determine what should be retained or improved. - Define goals and ambitions, considering biodiversity, risk management, and product diversification. - Analyze the local environment, considering soil type, groundwater levels, historical land use, nature goals, and land use regulations. - Design the agroforestry system, considering species selection, planting distances, and interactions between trees and crops. - Develop a revenue model by defining the target audience, customers, strategic partners, and sources of financing. In the follow-up project, practical experience will be gained through the construction of 'test plots' and make this knowledge available to a large group of farmers through the development of Do-It-Yourself test packages with associated fact sheets.
LESSON LEARNED	Due to the occurrence of open landscapes, there would be many opportunities for agroforestry in the Netherlands. Some important lessons learned include: 1) Understanding the historical role of trees in farming landscapes is essential. Recognizing that trees have traditionally provided essential products and ecosystem services for farming families can help rekindle interest in agroforestry. 2) The project demonstrates the potential for diversified business models in agroforestry. Combining agriculture with recreation, education, and cooperative ventures can generate additional income and create a more resilient farming system. 3) The need for customization and creativity in agroforestry design is a significant lesson. One size does not fit all, and the project encourages farmers to adapt agroforestry systems to their specific circumstances, considering factors such as farm type, size, landscape, and personal interests and skills. 4) Agroforestry design is an iterative process. It evolves as more knowledge is gained, and this allows for ongoing improvements in agroforestry systems.

INNOVATION TITLE	**Criteria and indicators for the certification of the sustainable management of an agroforestry system PEFC**
OPERATIONAL GROUP	Newton-Agroforestry Network in Tuscany
COUNTRY	Italy
INNOVATION TYPE	Process
KEYWORDS	Agricultural production system, Farming practice, Climate and climate change, Agroforestry, sustainability
APPROACH AND MAIN RESULTS	Since November 2020, the Programme for Endorsement of Forest Certification schemes – PEFC Italy - has been on a path to develop a certification standard for the sustainable management of agroforestry systems. During the NEWTON project a working group with a large number of stakeholders from the agroforestry sector was established; in the spring of 2022, the PEFC national standard was created and in the summer of 2022 three pilot tests were carried out in the NEWTON project partner companies. The PEFC analysis had as objectives the study of the tools and standards for guaranteeing the traceability and sustainability of agroforestry production and the related products processed by the project partner companies. This studies were followed by an analysis of the type of certifiable products derived from the agricultural, livestock, forestry and agroforestry components of these products. During the pilot tests conducted with the company's technicians, it was possible to concretely analyse in the field the guidelines and indicators established during the standard drafting process, highlighting the difficult application of some and improving others. The main results obtained in the study carried out in the partner companies saw the identification of 48 products (or product categories) and 13 processed and manufactured products; these 61 products are potentially subject to certification, some of them with more than 35 different schemes of environmental and quality certification schemes worldwide. Thanks to the cooperation of the project partners, the document 'Criteria and indicators for the certification of the sustainable management of an agroforestry system PEFC ' was produced, the first European-wide certification standard for the tree component of an agroforestry system, available from 2023, to valorise local agroforestry products.
LESSON LEARNED	According to the PEFC Italia scheme, the certification of the sustainable management of an agroforestry system allows access to the market with product and system traceability certifications to give the end consumer a guarantee of the correct management of the company system. The experiences and knowledge gained during the project will be taken as an example by others in the regional and national scene, and for the project partner companies it will be a document already known and easily implemented for the certification of products resulting from sustainable agroforestry management.

INNOVATION TITLE	**Practitioner-oriented consulting for agroforestry systems in Austria**
OPERATIONAL GROUP	Agroforst in Österreich
COUNTRY	Austria
INNOVATION TYPE	Service
KEYWORDS	Agroforestry, knowledge transfer, practitioner, advise
APPROACH AND MAIN RESULTS	The OG seeks to promote agroforestry in Austrian agriculture by means of establishing demonstration sites and generating practical knowledge. In Austria, the existing consulting services in agriculture did not meet the demand of farmers interested in agroforestry to provide them with guidance and support. When the OG started, there was no state-based consulting for identification of suitable agroforestry systems and their implementation. The OG created a novel consulting service for agroforestry in Austrian agriculture. The OG met this demand and created learning opportunities for the multiple actors involved: six farmers in Upper- und Lower Austria, who were willing to implement site-adapted agroforestry systems, the Lower Austria's Chamber for Agriculture, and various experts in agroforestry. Lower Austria is one of eight Austrian provinces (plus Vienna). Establishing the demonstration sites benefited from practitioners' interest in and readiness for the topic. The OG foresaw support for the planning and implementation of site-adapted agroforestry systems. Practitioners' demands met with the support provided in the OG. With support of German and Swiss consultants, suitable systems were identified, plans for planting designed, means for browsing protection found and the farmers could plant and maintain the young trees. Participating farmers bought the tree seedlings with their own sources. EIP Agri does not provide for investment funding. A brochure for consulting on agroforestry in Austria pulls the existing knowledge together. It explains the notions of agroforestry, how farms and the environment benefit from it, provides planning tools and suggestions for implementation, the range of suitable tree species, possible problems that may occur and how to solve them.
LESSON LEARNED	The OG raised awareness for agroforestry among practitioners and in administrations, made concrete how different systems are implemented in practice, and the (potential) benefits which they delivered. The new Austrian GAP Strategic Planning for 2023-2027, however, does not include dedicated funding for agroforestry. Public support is yet available. The OG published an easy-to-read leaflet, which informs about alternative GAP fundings. There was great diversity of agroforestry systems in the project, which allowed to generate a broad range of information material and support within the three-year project duration

INNOVATION TITLE	**Review assesses the state of the art regarding the use of livestock for ecosystem management in Mediterranean landscapes**
OPERATIONAL GROUP	SILVPAST - Cost-efficient implementation of silvo-pastoral mosaics of Quercus pyrenaica
COUNTRY	Portugal
INNOVATION TYPE	Process innovation
KEYWORDS	Multifunctional forest management, landscape/land management; Agroforestry; Managing ecosystem services
APPROACH AND MAIN RESULTS	In the Mediterranean basin, the structure and species composition of traditional landscapes have historically been shaped and maintained by human-driven disturbances, such as extensive live- stock grazing. The cessation of these activities, which have partially replaced the role of natural disturbances, may lead to vegetation overgrowth and biomass accumulation, with potential adverse impacts on biodiversity, ecosystem functions and services. Recently, the use of livestock for ecosystem management, with the purpose of maintaining grazing disturbance and the associated ecosystem processes, has been gaining traction. Nevertheless, there is still limited evidence on the performance of such grazing interventions. This review assesses the state of the art regarding the use of livestock for ecosystem management in Mediterranean landscapes. It examines the association between the regime and duration of grazing interventions and their reported effects on ecosystems. The list of reviewed interventions (68 interventions, retrieved from 47 studies) covered a diverse range of landcover systems (from grasslands to forests), of grazing regimes (characterized by different levels of grazing intensity and livestock species), and of duration of grazing (from short-term, < 5 years to long-term grazing, > 20 years). Wildfire prevention and biomass control, biodiversity and habitat conservation and the regulation of soil quality are the main reasons for the use of grazing interventions.
LESSON LEARNED	The results of this review suggest that the use of domestic herbivores in ecosystem management can contribute to wildfire prevention and biomass control, with these positive effects fading away in long-term grazing interventions. Goats seem to perform better than cattle for biomass control. Overall, the retrieved data revealed heterogenous findings on the use of domestic herbivores for ecosystem management in Mediterranean landscapes. The use of grazing for wildfire prevention and biomass regulation generally yielded positive outcomes, with lower performances observed in longer grazing interventions. On the other hand, using grazing for biodiversity and habitat conservation generated a diversity of outcomes, which were generally positive for extensive and moderate grazing regimes and significantly negative for intensive grazing regimes. Finally, outcomes for the regulation of soil quality were mainly negative, and a common trade-off with other ecosystem services, which calls for dedicated research that contributes to improved livestock management to avoid and mitigate these impacts.