


# ITHub 1

## Wood Mobilization



 FOREST4EU

# EXTENDED SUMMARIES

## ITHub 1 – Wood mobilisation (37 extended summaries)

*Overview of the extended summaries of ITHub 1.*

	<b>Title of innovation</b>	<b>Operational Groups (short name)</b>	<b>Country</b>
1	Growing Stock Volume Map to support forest operation planning	GO-SURF	Italy
2	Standardization of available forest data: the first step to support wood mobilization in Friuli Venezia Giulia	GO-PRI.FOR.MAN	Italy
3	PRI.FOR.MAN Dashboard: Overview of Wood Resources at NUT3 Level to Support Wood Mobilization and Value Chain	GO-PRI.FOR.MAN	Italy
4	Assessment of Costs in Harvesting Systems using an Web-based Tool (WoodChainManager)	eGOZD	Slovenia
5	A system for Quality assessment of Forestry Contractors	eGOZD	Slovenia
6	Creating Your Own Estate Plan Via The Online Portal (MojGozdar)	OG eGozd	Slovenia
7	Software for mobilisation and efficient use of resources involved in transportation of timber from forest to destination location	OG IR_MP3	Latvia
8	New market for Silver fir products (LVL)	OG Silver Fir	France
9	Implementation of innovative forestry trials: improvement at lower cost (under revision by the coordinator)	OG RAISON	France
10	Innovative process for storing and preserving lumber in logs or transformed by temperature control	OG CooldWood(r)	France
11	Laforêtbougé web platform (for connecting owners and professionals)	OG Sylviconnect	France
12	Technique for superficial heat treatment on wood product	OG Noir&Sens	France
13	Sylv'éclair a decision support tool for thinning in pine plantation	OG SPNA	France
14	Mechanical structural classification for Pinus pinaster ssp atlantica in the northern Iberian Peninsula approved by the European Normalization Committee.	OG SIGCA	Spain
15	LVL (Laminated Veneer Lumber) of fagus silvatica	OG FAGUS	Spain

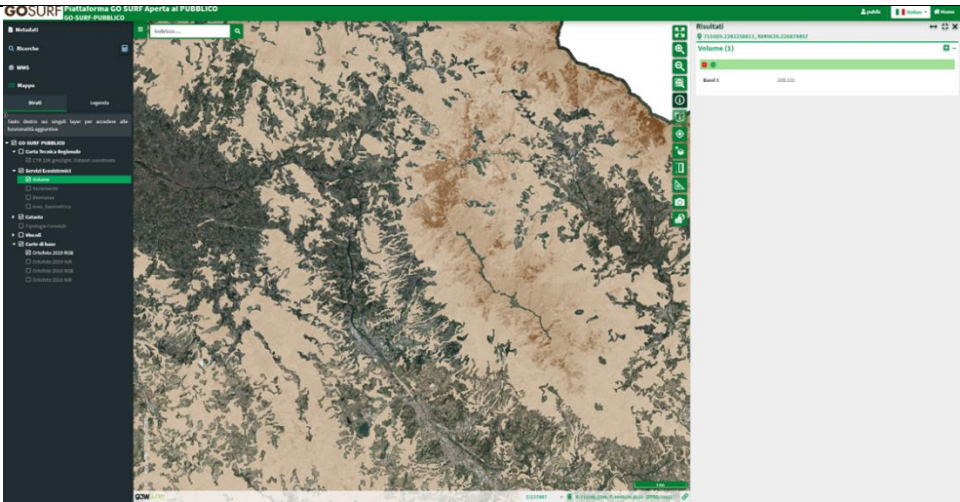
16	Visual structural grading tool and a mechanical structural grading tool	OG FAGUS	Spain
17	Wood potentially available for harvesting activities	GO-PRI.FOR.MAN	Italy
18	MOTI	DIGIGOZD	Slovenia
19	SiWaWa	DIGIGOZD	Slovenia
20	Online tool for quality classification of round-wood	eGOZD	Slovenia
21	Web-based due diligence and traceability system for forest timber assortments	eGOZD	Slovenia
22	New methodology for Douglas-fir timber qualification	Do.Na.To	Italy
23	Prefabricated modular construction system made from Normandy hardwoods	Normandy Wood Building	France
24	Map accessibility of forest parcel to support wood mobilization	GO-SURF	Italy
25	Growing Stock Volume mapping using Remote Sensing Data	GO.FORTRACK	Italy
26	UAV to map growing stock volume for sharing forest management plan	GO-PRI.FOR.MAN	Italy
27	Mapping forest assortment at parcel level to support wood mobilization	GO-SURF	Italy
28	Di-Gozd Digital Forest Inventory - Mobile app	Di-Gozd	Slovenia
29	Di-Gozd Digital Forest Inventory - Internet app	Di-Gozd	Slovenia
30	Social network of sustainable forest use for the production of biomass for thermal purposes	Calor Rural	Spain
31	Innovation in products, processes and marketing to introduce local woods with special, greater value-added characteristics to the Catalan market	SINGULARWOOD	Spain
32	Development of an efficient logging system using the LOGGFORCAT boom harvester	LOGGFORCAT	Spain
33	Development of a prototype cross-laminated timber panel made from local timber to improve the construction of buildings in terms of sustainability	not found	Spain
34	Improving the bond between steel and synthetic cable (MUCAS)	OG MUCAS	Spain
35	Rural propriety management platform	GO PROMINIFUND	Spain

36	Methodology for assessing the economic-financial sustainability of forest holdings	GO PROMINIFUND	Spain
37	Logging trailer - solution for efficient use of transportation resources of farmers out of agricultural season	IR_MP3	Latvia

## ITHub 1 - 1

<b>Title of innovation</b>	<b>Growing Stock Volume Map to support forest operation planning</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	UNIFI
<b>Operational Group (short name)</b>	GO-SURF
<b>Operational Group (name)</b>	DECISION SUPPORT TO SUSTAINABLE FOREST PLANNING
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest owners, forest company, NGOs, research institutions, advisor
<b>Link from OGs database</b>	<a href="https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/supporto-decisionale-alla-pianificazione-forestale">https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/supporto-decisionale-alla-pianificazione-forestale</a>
<b>Country, region, city</b>	Italy, Tuscany
<b>Type of innovation</b>	Service
<b>Keywords</b>	Forestry, Remote Sensing data, digital platform, Decisional Support System, wood mobilization

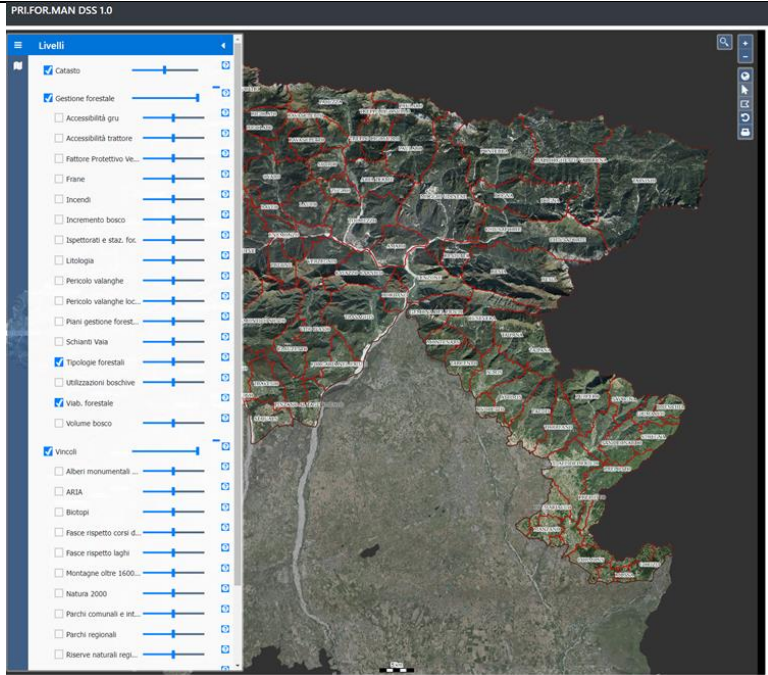
<p><b>Approach and main results</b></p>	<p>To effectively plan forest operations and optimize resource allocation, it is of utmost importance to map the Growing Stock Volume (m<sup>3</sup>/ha) within a specific area. This information plays a critical role in conducting economic evaluations of forest operations and supporting forest management planning. Traditionally, acquiring such data has involved labor-intensive and expensive fieldwork, posing a significant burden, especially for small-scale forest owners. However, recent advancements in research have yielded remarkable progress in developing modeling and prediction techniques that leverage freely available data sources like the National Forest Inventory and Remote Sensing Data. These approaches enable the creation of accurate and detailed maps of Growing Stock Volume. These maps hold tremendous value for forest operation planning and have been successfully implemented throughout the Tuscany Region as part of the GO-SURF initiative. By utilizing data from the National Forest Inventory plots and open-access Landsat imagery, a high-resolution map of Growing Stock Volume has been generated for all regions in Tuscany, boasting a spatial resolution of 23 m x 23 m. This technological leap not only reduces the costs associated with data acquisition but also grants small forest owners, who typically face limited budgets for field campaigns, access to this invaluable information. Additionally, forest companies seeking suitable forests for logging purposes can benefit significantly from these comprehensive maps.</p> <p>The resulting map is conveniently accessible through a Decision Support System Platform, empowering users to query the data through interactive tools like drawing or uploading polygons. The way to query the data was co-designed with farmers, forest owners, forest managers and forest company in order to be sure to fit their needs. This type of query the Growing Stock Map through the platform facilitates direct extraction of reports and geographic data, streamlining decision-making processes and elevating overall forest management practices. By leveraging these advancements, stakeholders can make informed choices and ensure the sustainable management of forest resources. The access to the Growing Stock map through the DSS can bring several benefits for Tuscany Forest Sector, including improved resource allocation, enhanced operational efficiency, better risk management, and the ability to plan and implement sustainable forest management practices also in small forest owners' properties that usually are abandoned. In this sense the map in the next years can be used to develop efficient and sustainable wood mobilization practices that are essential to ensure a continuous supply of timber and wood products while minimizing environmental impacts. The maps can be used also to identify productive areas that can be used to build new wood value-chains that are not well organized in Tuscany forest sectors.</p>
<p><b>Lessons learned</b></p>	<p>An interesting lesson learned from GO-SURF is that it is possible to introduce digital tools in the forestry sector of Tuscany. The introduction of the GO-SURF Growing Stock map occurred in a context where stakeholders were not accustomed to using digital tools. However, the co-designed platform has facilitated access to the Growing Stock Map. Moreover, analyzing the daily access to the DSS platform, we have observed a continuous increase in usage (from an average of 10 users per month in the first month to 40 users per month currently).</p>

	<p>Accessing the map does not require users to have knowledge of complex models and algorithms used in its generation. In fact, users are not required to have knowledge of remote sensing data or national inventory data. Users are provided with the specific product they need and are interested in, which is the map of Growing Stock Volume. As suggested by forest owners, managers, and companies involved in the co-design of the platform, the Growing Stock Volume map allows for a better understanding of wood resources within an area and is useful for assessing forest operations and management activities in a sustainable way.</p>
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<b>Links to website/report/video</b>	Video: <a href="https://youtu.be/tlyNjOTKPXY">https://youtu.be/tlyNjOTKPXY</a> - Website: <a href="https://www.go-surf.it/">https://www.go-surf.it/</a>
<b>Pictures</b>	

## ITHub 1 - 2

<b>Title of innovation</b>	<b>Standardization of available forest data: the first step to support wood mobilization in Friuli Venezia Giulia</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	UNIFI
<b>Operational Group (short name)</b>	PRI.FOR.MAN
<b>Operational Group (name)</b>	Shared PRivate FORest MANagement in Eastern Alps
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer)</b>	Forest companies, advisors, research institutions

<b>interests groups or other NGOs)</b>	
<b>Link from OGs database</b>	<a href="https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali">https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali</a>
<b>Country, region, city</b>	Italy, Friuli Venezia Giulia
<b>Type of innovation</b>	Service
<b>Keywords</b>	Forestry, Remote Sensing data, digital platform, Decisional Support System, wood mobilization, new value chain, Sustainable Forest Management
<b>Approach and main results</b>	<p>In Friuli Venezia Giulia, located in the eastern Alps of Italy, approximately 32% of the region is covered by forests. However, their utilization is much lower than their growth. Sustainable forest management in this region faces challenges due to depopulation in the mountains and various other factors, including inadequate forest roads, a limited number and size of logging and primary processing companies, and excessive fragmentation of land ownership. In fact, the majority of regional forests are privately owned (60%), with highly fragmented parcels of land, some smaller than 1000 m<sup>2</sup>. Furthermore, it is important to note that a single parcel often has multiple owners, some of whom may not be reachable due to their non-residency in the area. In this context, PRI.FOR.MAN OG is working towards addressing these issues and implementing a new collaborative approach to managing small forest properties. However, to achieve this goal, standardized information on forest parcels is crucial. Although many pieces of information on forest parcels were already available in Friuli Venezia Giulia, they were scattered across various administrative portals. As a result, even if the information were accessible, it was often not organized in a standardized and uniform format. This poses challenges for forest stakeholders and owners who require consistent and reliable information. To improve the situation, PRI.FOR.MAN has focused its efforts on centralizing and standardizing the information on forest parcels, making it easily accessible and facilitating collaborative forest management initiatives. For the first time in the region, a geodatabase was created to centralize the forest-related data from different administrative portals into a single, comprehensive database. This allows streamlined access to information and facilitates standardized data management. The collected and standardized geographic layers can be categorized into three types: (1) Basic cartographic layers, including cadastral parcels, the regional technical map at a scale of 1:5000, public roads, and regional orthophotos with a resolution of 10 cm; (2) Forest management layers, including forest categories, existing forest management plans, forest roads, presence of disturbances, and information related to past harvesting areas; (3) Environmental constraints, including an estimation of the protective role exercised by forest vegetation, the location of biotopes, regional or state parks and reserves, and Natura 2000 sites with specific connections to current regulations (e.g., conservation and development measures) and/or management plans. PRI.FOR.MAN ensures that the available geographic layers have been verified to resolve any topological errors, standardized, and, if necessary,</p>

	<p>converted/transformed into the RDN2008/UTM zone 33N reference system (EPSG 6708). The standardized layers were then organized using a systematic approach to structure and categorize the forest data based on relevant parameters such as location, ownership, forest type, and ecological features. Finally, the data were published in the Decision Support System Platform developed within the context of PRI.FOR.MAN. This platform enables the sharing of forest-related data among stakeholders, including forest owners, management agencies, researchers, and other interested parties. It provides user-friendly access to standardized data within a unified environment. Moreover, the classification of the layers allows users to quickly access the necessary information without getting lost in various administrative portals.</p>
<p><b>Lessons learned</b></p>	<p>Organizing the geographic data related to the available information from various administrative portals in the Friuli Venezia Giulia region required a significant amount of work in terms of man-hours dedicated to data standardization. Furthermore, it was not always easy to quickly find the information needed. Some information was not standardized in databases or in a rational manner, necessitating the process of digitization. In the organization of the layers within the categorized strata, the input of technicians and end-users was crucial, as it allowed for proper categorization that reflects their specific needs</p>
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<p><b>Links to website/report/video</b></p>	<p><a href="https://www.legnoservizi.it/attivita/innovazione/">https://www.legnoservizi.it/attivita/innovazione/</a></p>
<p><b>Pictures</b></p>	 <p>The screenshot displays the PRI.FOR.MAN DSS 1.0 interface. On the left, there is a 'Livelli' (Layers) panel with a list of categories and their corresponding layers. The 'Catasto' layer is checked. Under 'Gestione forestale', several layers are visible, including 'Accessibilità gru', 'Accessibilità trattore', 'Fattore Protettivo ve...', 'Frane', 'Incendi', 'Incremento bosco', 'Ingegnatori e stat. for.', 'Utilologia', 'Pericolo valanghe', 'Pericolo valanghe bc...', 'Piani gestione forest...', 'Schianti Vasa', 'Tipologie forestali', 'Utilizzazioni boschive', 'Viab. forestale', and 'Volume bosco'. Under 'Vincoli', layers include 'Alberi monumentali...', 'ARSA', 'Biotopi', 'Fasce rispetto corsi d...', 'Fasce rispetto laghi', 'Montagne oltre 1600...', 'Natura 2000', 'Parchi comunali e int.', 'Parchi regionali', and 'Riserve naturali regi...'. The main map area shows a topographic view of a forested region with red lines indicating boundaries or specific features. The interface includes a search bar, zoom controls, and a scale bar.</p>

## ITHub 1 - 3

<b>Title of innovation</b>	<b>PRI.FOR.MAN Dashboard: Overview of Wood Resources at NUT3 Level to Support Wood Mobilization and Value Chain</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	UNIFI
<b>Operational Group (short name)</b>	PRI.FOR.MAN
<b>Operational Group (name)</b>	Shared PRivate FORest MANagement in Eastern Alps
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest companies, advisors, research institutions
<b>Link from OGs database</b>	<a href="https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali">https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali</a>
<b>Country, region, city</b>	Italy, Friuli Venezia Giulia
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Forestry, Remote Sensing data, digital platform, Decisional Support System, wood mobilization, new value chain, Sustainable Forest Management
<b>Approach and main results</b>	<p>Supporting wood mobilization and establishing new value chains in a forest area involves the development of a comprehensive framework and system to optimize the utilization of forest resources, enhance economic value, and promote sustainable forest management practices. The setup of a new value chain focused on wood mobilization in a forest area requires a holistic approach that considers various aspects such as forest management, stakeholder collaboration, market dynamics, and sustainability principles. Through strategic planning and implementation, a well-designed value chain can contribute to the economic growth, environmental protection, and social well-being of the forest area and its surrounding communities.</p> <p>One of the initial steps in establishing a value chain and improving wood mobilization is analyzing the existing wood resources and assessing their potential for value-added products and services. In this context, PRI.FOR.MAN has developed different forest geographic layers that describe forest resources, including the Growing Stock Volume map and Forest Types maps. Additionally, the OG has developed additional geographic layers, such as the Accessibility map of forest parcels and forest roads, which are important for analyzing the</p>

	<p>resources for wood mobilization. All these maps have been implemented in a Decision Support System accessible through the internet.</p> <p>To provide forest stakeholders at the NUT3 level with an overview of forest resources, PRI.FOR.MAN has also developed an easy-to-use dashboard that provides summarized information. This dashboard utilizes the forest geographic layers to present valuable insights and information on forest resources in a specific major area (NUT3). It features easily understandable graphs and tables that provide data on the forest area managed under forest management plans, the area accessible through two specific harvesting systems (tractor and cable yard, the most commonly used systems in the Friuli Venezia Giulia Alps), and the Growing Stock Volume accessible for the two harvesting systems. Furthermore, the dashboard provides the Growing Stock Volume accessible for each forest type, enabling an understanding of the potential wood products that can be obtained.</p> <p>The dashboard serves as a tool to identify areas in the region where new value chains linked with wood mobilization can potentially be established. Moreover, the data can be easily updated when new maps of forest resources are designed. The dashboard is intended for use by public bodies and forest companies to monitor the state of forests in Friuli Venezia Giulia. The availability of such comprehensive and accessible data was not present at the regional level before the establishment of PRI.FOR.MAN OG. The dashboard developed by PRI.FOR.MAN represents a crucial first step in identifying potential wood mobilization areas, which in turn aids in the development of value chains. Additionally, the dashboard, by providing information on the Growing Stock Volume accessible through two harvesting systems, can be utilized to identify areas where the road network is not well established, thus highlighting the need for investments in road planning.</p>
<p><b>Lessons learned</b></p>	<p>Creating user-friendly dashboards that provide useful information in the form of graphs or tables for identifying areas where new value chains can be established and promoting wood mobilization is not technically challenging when the maps developed within the PRI.FOR.MAN project are available. However, it requires a significant coordination effort among public administrators and developers. Access to the necessary data for generating the forest maps, which serve as the foundation of the system, is crucial and requires coordination between different stakeholders.</p> <p>Furthermore, it would be desirable for this type of activity to be carried out by the public administration, as they can play a key role in incentivizing the emergence of new value chains through policies and measures. The members of the GO strongly believe that such dashboards should be developed for public utility, providing support to the forest sector. PRI.FOR.MAN has successfully demonstrated that the development of dashboards is feasible and can be easily implemented, even within Forest Information Systems.</p>
<p><b>Contact information</b></p>	<p>Giorgio Alberti <a href="mailto:giorgio.alberti@unud.it">giorgio.alberti@unud.it</a> - Luca Cadez <a href="mailto:luca.cadez@uniud.it">luca.cadez@uniud.it</a> - Francesca Giannetti <a href="mailto:francesca.giannetti@unifi.it">francesca.giannetti@unifi.it</a></p>

**Links to website/report/video** [https://lookerstudio.google.com/u/0/reporting/2f6c2f81-b78f-446c-ab07-96571d7b6984/page/p\\_w5k3gvls6c](https://lookerstudio.google.com/u/0/reporting/2f6c2f81-b78f-446c-ab07-96571d7b6984/page/p_w5k3gvls6c)

**Pictures**

**Pannello dati comunali**

Dati riferiti solo all'area montana e collinare

Seleziona un comune: BUDOIA (1)

Superficie boscata (ha) 2.190    Volume medio (m3 ha-1) 204    Volume reale (m3) 421.486

Comune	Gestione	Accessibilità	Superficie (ha)	Volume medio (m3 ha-1)	Volume reale (m3)
1. BUDOIA	managed	not accessible	399	331	132.343
2. BUDOIA	not managed	not accessible	364	126	45.999
3. BUDOIA	managed	accessible	571	225	128.573
4. BUDOIA	not managed	accessible	856	134	114.671

1-4/4

**Superficie gestita e non**    **Superficie accessibile e non**    **Volume accessibile e non**

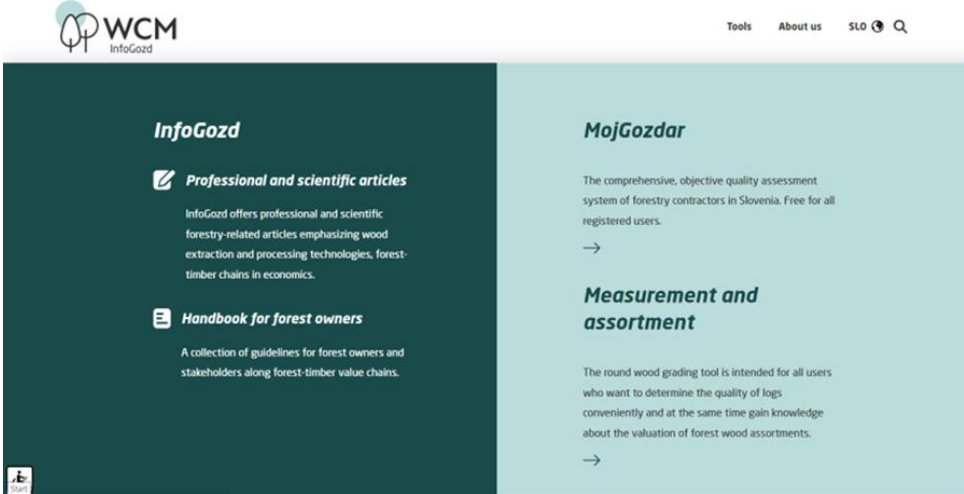
Volume reale (m3) per categoria forestale

Ripartizione del volume reale (m3)

## ITHub 1 - 4

<b>Title of innovation</b>	<b>Assessment of Costs in Harvesting Systems using an Web-based Tool (WoodChainManager)</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	GIS
<b>Operational Group (short name)</b>	eGozd
<b>Operational Group (name)</b>	Electronic management of agricultural holdings with emphasis on forestry activity
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental)</b>	farmers, forest owners, researchers, advisors, businesses, environmental groups

<b>groups, consumer interests groups or other NGOs)</b>	
<b>Link from OGS database</b>	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/elektronsko-poslovanje-kmetijskih-gospodarstev-z.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/elektronsko-poslovanje-kmetijskih-gospodarstev-z.html</a>
<b>Country, region, city</b>	Slovenia
<b>Type of innovation</b>	Service
<b>Keywords</b>	Calculations, costs, harvesting system, norms, web-tool, optimization, model, wood mobilization
<b>Approach and main results</b>	Streamlining work processes is increasingly important in a difficult market environment. Rational production requires that we are always aware of what and how much needs to be invested in a business process to deliver the desired products or services without economic loss. The Slovenian Forestry Institute has developed a tool for estimating the costs of forest timber supply. WoodChainManager is a web-based tool consisting of three user modules designed to estimate the material costs of individual machines or the total costs of all selected machines in a timber harvesting system. Users can test the impact of individual technologies on the total material costs of a harvesting system and thus optimise work processes. The basic tool for describing harvesting systems is a matrix that visualises the felling and harvesting process from the standing tree in the stand to the forest products at the end user. The method chosen to calculate the cost of each machine is simple, but still reflects the actual costs incurred. WoodChainManager offers cost calculations for a wide range of technologies, machines and associated attachments. The authors of this innovation want to increase awareness and understanding of costing and to offer the possibility to directly compare different harvesting systems.
<b>Lessons learned</b>	Cost is an important issue in the selection of individual machines and the integration of individual links in production process chains. The development of the web tool focused on the visualisation of forest-wood production chains with a simple method for cost calculation. The costing tool makes users aware that the choice of appropriate technology can have a significant impact on production costs. It allows users to determine which timber extraction operations will be included in the production chain (logging, harvesting, felling/sawing, chip production, harvesting/transport) and the location where the operations will be carried out (forest stand, logging, forest train, etc.). The user can choose between several different machines and associated accessories. Currently, the database contains data for more than 100 different machines or equipment for forestry activities. In addition to direct material costs, the calculations also include information on the effects of the machines, allowing a calculation per unit of product (e.g. €/m <sup>3</sup> ). The application allows an easy selection of the technological model for the production of roundwood and green wood chips.
<b>Contact information</b>	<a href="mailto:gteinfo@gozdis.si">gteinfo@gozdis.si</a>

Links to website/report/video	<a href="https://wcm.gozdis.si/sl/orodja/">https://wcm.gozdis.si/sl/orodja/</a>
Pictures	

## ITHub 1 - 5

Title of innovation	<b>A system for Quality assessment of Forestry Contractors</b>
ITHub	1
FOREST4EU partner (short name)	GIS
Operational Group (short name)	eGozd
Operational Group (name)	Electronic management of agricultural holdings with emphasis on forestry activity
Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)	farmers, forest owners, researchers, advisors, businesses
Link from OGs database	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/elektronsko-poslovanje-kmetijskih-gospodarstev-z.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/elektronsko-poslovanje-kmetijskih-gospodarstev-z.html</a>
Country, region, city	Slovenia
Type of innovation	Service
Keywords	Services, operations, quality, evaluation, management, wood mobilization


<p><b>Approach and main results</b></p>	<p>The forestry services market is dynamic. Skilled forestry contractors are needed to meet the increased demand for wood and to maintain a competitive edge in forestry. There is often limited knowledge about how well they fulfil demands about resource efficiency, social responsibility and environmental protection. The problem is particularly apparent when there is an increased demand for services in the event of large-scale disturbances (eg ice and wind storms, bark beetle attacks, etc.), when individual forest owners do not have information about service providers and their quality and reliability. Clients of services, especially small forest owners who need services less often and have no experience with forest management, make their decisions mainly based on intuition and personal acquaintances. That is why an online system was developed for the assessment of forestry contractors following sustainability principles. A system for assessing the quality of forestry contractors in Slovenia "MojGozdar" consists of three levels: (1) Formal suitability of forestry contractors based on available data sources on business entities; (2) Expert assessment of suitability of forestry contractors; (3) Customer rating on service quality. In addition to the requirements for professional competences and legislative obligations, the system proposes a number of additional requirements such as corporate social responsibility, participation in the local community and greater environmental responsibility. The forestry contractor and the certification body sign a cooperation agreement to obtain the expert assessment. The expert assessment is performed by an evaluator authorised by a certification body. A web service has been introduced with the purpose of serving as a communication tool between professional evaluators and forestry contractors, as well as providing a new possibility for forest owners to get direct contact with forestry contractors. The system enables its users to exert influence on the assessment of forestry contractors by assessing the quality of their services. Private forests greatly benefit from customer feedback information on the service quality. MojGozdar offers users support in searching for skilled forestry contractors: Cutting with a chainsaw, Skidding, Silviculture works, Fully mechanized harvesting, Production of wood chips (chopper), Forest construction, Transport of round wood and wood chips, Purchase of wood on the truck road.</p>
<p><b>Lessons learned</b></p>	<p>The MojGozdar online system is an important connecting link between Slovenian forest owners and other forestry service seekers on the one hand, and forestry contractors on the other. The reaction to MojGozdar is positive both from the part of the contractors and users. The user provides a wide range of options, from searching for contractors and establishing contacts with them, to digital management of key documentation related to the implementation of forestry works. Such tools are also very interesting from a statistical point of view. When the majority of contractors in a country are included in such a system, it will also give a good overall statistic about the number and size of contractor companies as well about the kind of services that they provide.</p> <p>The online information system MojGozdar represents the beginning of the establishment of modern information and communication flows and as such raises the level of digitization in the field of efficient and economically sustainable</p>

	forest management and directly affects the increase in productivity and added value in the entire forest and wood production chain.
Contact information	<a href="mailto:gteinfo@gozdis.si">gteinfo@gozdis.si</a>
Links to website/report/video	<a href="https://www.mojgozdar.si/">https://www.mojgozdar.si/</a>
Pictures	

## ITHub 1 - 6

Title of innovation	<b>Creating Your Own Estate Plan Via The Online Portal (MojGozdar)</b>
ITHub	1
FOREST4EU partner (short name)	GIS
Operational Group (short name)	eGozd
Operational Group (name)	Electronic management of agricultural holdings with emphasis on forestry activity
Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)	farmers, forest owners,
Link from OGs database	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/elektronsko-poslovanje-kmetijskih-gospodarstev-z.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/elektronsko-poslovanje-kmetijskih-gospodarstev-z.html</a>
Country, region, city	Slovenia

<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	estate plan, model, web- tool, system, wood mobilization
<b>Approach and main results</b>	<p>The project eGOZD has presented a web-based solution for developing a forest management plan. The solution enables the collection and interpretation of data on forest tenure, forest infrastructure and other data published on different publicly available platforms in one place using interoperability. Introducing the plans on farms owning forests promotes increased planned work with private forests and provides professional support for sustainable, nature and multifunctional forest management. It is coordinated with forest management plans, which ensures the sustainable conservation of forests and all their functions. A well-prepared management plan will ensure that the potential of the timber is properly exploited, contributing to the modernisation and sustainable development of the rural areas.</p> <p>The project "eGozd" has developed new and simplified options for planning, monitoring and carrying out work and for more efficient private forest management (FM). The forest estate plan provides the forest owner with an overview of forest data and the possibilities for future forest management. The FM plan is linked to current prices for forest timber and tools for calculating the costs of timber extraction. Forest owners can monitor the performance of their forest estate and decide on the measures to be taken in the plan. The plan considers nature conservation guidelines and promotes habitat types' conservation or even improvement.</p> <p>A well-prepared management plan will ensure that the potential of the timber is properly exploited, contributing to the sustainable development of the rural areas. Using technical information systems, business processes can be digitised. By visualising and economically evaluating individual production processes, private owners gain better control over the costs of producing forest wood sorts. Forest owners can thus optimise their own different production processes on the same site, or the same production process on different sites, or even replace their own implementation by hiring a contractor due to their own costs being too high; this serves to decide on the most optimal implementation of the works.</p>
<b>Lessons learned</b>	<p>The estate plan will help agricultural holdings become aware of any constraints on forest management at the expense of management and the possible sources of funding or reimbursement of costs incurred due to the restrictions management options. The estate plan will specify/advise on and concretise the measures to be taken. The estate plans allow the owners to have an overview of the state of the estate with the existing forestry potential. It is an information system that is continuously adapted to forest management plans. It contributes to the conservation of biodiversity. One of the key advantages of interactive estate plans is the possibility to organise work, choose technologies and operators, and estimate production costs from forest to timber storage. This allows the forest owner to optimise the activities selected to implement the measures. Not only does the introduction of management plans ensure the transfer of new knowledge, but it also updates and optimises existing on-farm activities.</p>

Contact information	<a href="mailto:gteinfo@gozdis.si">gteinfo@gozdis.si</a>																																		
Links to website/report/video	<a href="https://www.mojgozdar.si/">https://www.mojgozdar.si/</a>																																		
Pictures	 <p style="text-align: center;"><b>Posestni načrt</b></p> <p><b>I. Opis gozdne posesti</b></p> <p><b>I.1. Splošni opis posesti</b></p> <p><b>Posestvo</b></p> <table border="1"> <tr> <td>Ime posesti</td> <td>Gozd Prednje ja privatna parcela</td> </tr> <tr> <td>Površina posesti</td> <td>17048 m<sup>2</sup></td> </tr> </table> <p><b>Parcele na posestvu</b></p> <table border="1"> <thead> <tr> <th>Parcelna številka</th> <th>Katastrska občina</th> <th>Površina na posesti [m<sup>2</sup>]</th> <th>Delež glede na celotno posest [%]</th> </tr> </thead> <tbody> <tr> <td>1625/222</td> <td>2370</td> <td>16657</td> <td>97.7</td> </tr> </tbody> </table> <p><b>Revirni gozdarji</b></p> <table border="1"> <thead> <tr> <th>Naziv revirja</th> <th>Revirni gozdar</th> <th>Sedež pisarne</th> <th>Kontaktni telefon</th> <th>Površina na posesti [m<sup>2</sup>]</th> <th>Delež glede na celotno posest [%]</th> </tr> </thead> <tbody> <tr> <td>OTLICA</td> <td>Muznik Damijan</td> <td>Gregorčičeva 44</td> <td>05 366 14 88</td> <td>16657</td> <td>97.7</td> </tr> </tbody> </table> <p><b>Gozdnogospodarske enote</b></p> <table border="1"> <thead> <tr> <th>Gozdnogospodarsko območje</th> <th>Gozdnogospodarska enota</th> <th>Ime Gozdnogospodarske enote</th> <th>Površina na posesti [m<sup>2</sup>]</th> <th>Delež glede na celotno posest [%]</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>14</td> <td>OTLICA</td> <td>16657</td> <td>97.7</td> </tr> </tbody> </table>	Ime posesti	Gozd Prednje ja privatna parcela	Površina posesti	17048 m <sup>2</sup>	Parcelna številka	Katastrska občina	Površina na posesti [m <sup>2</sup> ]	Delež glede na celotno posest [%]	1625/222	2370	16657	97.7	Naziv revirja	Revirni gozdar	Sedež pisarne	Kontaktni telefon	Površina na posesti [m <sup>2</sup> ]	Delež glede na celotno posest [%]	OTLICA	Muznik Damijan	Gregorčičeva 44	05 366 14 88	16657	97.7	Gozdnogospodarsko območje	Gozdnogospodarska enota	Ime Gozdnogospodarske enote	Površina na posesti [m <sup>2</sup> ]	Delež glede na celotno posest [%]	01	14	OTLICA	16657	97.7
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## ITHub 1 - 7

Title of innovation	<b>Software for mobilisation and efficient use of resources involved in transportation of timber from forest to destination location</b>
ITHub	1
FOREST4EU partner (short name)	LLA
Operational Group (short name)	IR_MP3
Operational Group (name)	Innovative solutions in planning and organization of agricultural and forestry produce transportation
Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer)	Seven (7) private agricultural, forestry and transport companies agricultural and forestry sector, one researcher (Riga Technical university), two NGOs (Latvian Logistics association and Latvian Association of Agricultural Cooperatives)

<b>interests groups or other NGOs)</b>	
<b>Link from OGs database</b>	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/inovat%C4%ABvirisin%C4%81jumi-lauksaimniec%C4%ABbas-un.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/inovat%C4%ABvirisin%C4%81jumi-lauksaimniec%C4%ABbas-un.html</a>
<b>Country, region, city</b>	Latvia
<b>Type of innovation</b>	Process
<b>Keywords</b>	Wood mobilization, ITC technology, Decisional Support System, Business model, Cooperation, Organisational innovation
<b>Approach and main results</b>	<p>OG has developed software for mobilisation and efficient use of resources involved in transportation of timber from forest to destination locations - processing facilities, sea port etc. Furthermore, software, when used by forest owner, can be used to estimate and map amount of timber in the forest locations and manage this asset. Transportation of timber from forest to production mostly is made by local transportation companies (logistics services). Usually they are small businesses and not able/interested to invest in developing complex logistical systems. They use "reporting approach" of what has been transported. That does not help planning of logistics. Problem that has been addressed by this software tool is complexity of logistics where task is to transport numerous different kinds of timber from different locations to multiple destinations while often one pick-up point does not contain full truck load of one type of timber. Provided solution is a database that is accessible on-line to all involved parties over GSM network.</p> <p>First input is made when felling survey is done, then by a harvester stating actual dimensions and amount of cut trees, next input is made by transporter who delivers cut timber from forest to a stack on road side stack. There detailed amounts of each assortment becomes known (can reach up to 16 names of assortment in Latvia). GPS location on the map can be seen for each stack (including amount of each kind of timber there) as well as for each transportation unit. Customers (owners of cut timber) input request stating what kind of timber and what amount needs to be delivered where. Dispatcher can see available transportation resources with detailed technical capabilities that have been put into database by owners of trucks. Dispatcher then can plan most economical routs and tasks for every truck, issue documentation and electronically send it to truck drivers. Truck driver, while uploading the timber, updates status of the stack by recording quantities of each kind of timber been uploaded. Final input is made after unloading timber at final destination.</p>
<b>Lessons learned</b>	<p>Software has been tested in Latvia and neighbouring areas of Lithuania and Estonia.</p> <p>Proof of efficiency is sufficient decrease of no-load truck kilometres. Local adaptation of the software is linked with need for adjustments of output document formats determined by national regulations.</p>

<b>Contact information</b>	Guntars Reinfelds, Board chairman, SIA "SELF Lógistika", e-mail: <a href="mailto:guntars.reinfelds@selflogistic.lv">guntars.reinfelds@selflogistic.lv</a> ; Normunds Krumins, Board Chairman, LLA, e-mail: <a href="mailto:n.krumins@gmail.com">n.krumins@gmail.com</a>
<b>Links to website/report/video</b>	After registering user name and password will be provided, login to site <a href="http://graudvedis.selflogistic.lv">http://graudvedis.selflogistic.lv</a>
<b>Pictures</b>	

## ITHub 1 - 8

<b>Title of innovation</b>	<b>New market for Silver fir products (LVL)</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	CNPF
<b>Operational Group (short name)</b>	Silver fir
<b>Operational Group (name)</b>	Silver fir : Pre-study of innovation needs in the sawing of very large timber
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	forest owners, reasearchers, advisors, wood transformation companies
<b>Link from OGs database</b>	
<b>Country, region, city</b>	France, Auvergne - Rhône-Alpes
<b>Type of innovation</b>	Product
<b>Keywords</b>	Forestry, Supply chain, market and consumption, wood transformation, Silver fir, peeling, LVL products

<p><b>Approach and main results</b></p>	<p>Silver fir is a species for which it is important to find markets with added value. Numerous works carried out by the Auvergne inter-professional association (FIBOIS AURA) on this species have shown that there are potential outlets for peeling as well as for small sections; thus reducing the difficulties associated with drying.</p> <p>Birth of the project group. A first meeting was organized for the entire forest-timber sector to present the work previously carried out on the manufacture of plywood and LVL (Laminated Veneer Lumber) in order to encourage volunteers to go further on a common project. The objective being to continue work on the LVL in silver fir with the aim of validating the achievement of the expected quality and perhaps manufactured in Auvergne. This meeting allowed the partners to clearly express their fears and expectations regarding the project and to better define the contours of the action program.</p> <ul style="list-style-type: none"> <li>- Shared interest in a new product within our reach</li> <li>- Difficulty unwinding large and very large fir wood.</li> <li>- Need to scan the veneers in order to know the density and quality and carry out the sorting necessary for the manufacture of LVL</li> <li>- Need for a share of business self-financing</li> <li>- Role of the interprofession to collect, in complete confidentiality, comments, interests and wishes for each person to continue the study</li> </ul> <p>After numerous discussions, two companies in particular took on the project and were thus supported by the Auvergne Promobois inter-professional association (FIBOIS AURA) : Company C.B.D and Company Scierie Borie.</p> <p>Search for a new peeling company and partnership agreement</p> <p>For the project, it was necessary to find equipment capable of peeling very large fir wood with diameters of up to 1.20 meters. Only exotic wood peelers are able to meet this demand and there are few of them on French territory. Thus the TOUBOIS Company located in Chasseneuil sur Bonnieure (16260) was contacted and a partnership could be established.</p> <p>International market study</p> <p>An international market study was carried out on the basis of specifications and the search for service providers</p> <p>Choice and harvest of silver fir trees</p> <p>The specific needs for the wood to be harvested have been defined. Then cutting plots were visited and the wood marked with the sawmill technicians according to quality needs.</p> <p>Selection of silver fir logs, followed by peeling and veneer</p> <p>The fir logs are classified upon their arrival at the park in the sawmills. The identified and sorted logs are then transported to the peeling company TOUBOIS.</p> <p>Monitoring of veneers and LVL manufacturing</p> <p>2000 veneers were selected and sent from the TOUBOIS company to the Raute company in Finland. Each stage of LVL manufacturing was followed and analyzed together with the heads of partner companies:</p> <ul style="list-style-type: none"> <li>- Veneer scans</li> <li>- Design of the "millefeuilles" making up the LVL panels</li> </ul>
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	<ul style="list-style-type: none"> <li>- Gluing and manufacturing of LVL panels</li> <li>- Cutting samples for in situ tests and for the laboratory</li> <li>- Glue resistance tests at Raute company.</li> </ul>
<b>Lessons learned</b>	<p>The first difficulty was finding companies willing to take on such a project. Given the ambitious objectives of creating an industrial LVL production unit, the commitment of entrepreneurs took place in a delicate context without a regional industry. Experimentation and testing of LVL product samples demonstrates here that Auvergne silver fir veneers are technically suitable for the manufacture of LVL panels. The production of LVL always requires careful planning of the constitution of the "millefeuille" of the panels with sheets of adequate density. The market study validated the export potential essential to this project. The project has been approved in full and has entered its industrial development phase belonging to the two partner companies.</p>
<b>Contact information</b>	<p><a href="mailto:contact@fibois-aura.org">contact@fibois-aura.org</a>  <a href="mailto:a.laffont@fibois-aura.org">a.laffont@fibois-aura.org</a></p>
<b>Links to website/report/video</b>	<p><a href="http://www.fibois-aura.org">www.fibois-aura.org</a></p>
<b>Pictures</b>	

## ITHub 1 - 9

<b>Title of innovation</b>	<b>Implementation of innovative forestry trials: improvement at lower cost</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	CNPF
<b>Operational Group (short name)</b>	RAISON
<b>Operational Group (name)</b>	Network of adaptations of original forestry innovations in Normandy (RAISON)

<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Advisors (National forestry property centre - CNPF) ; Managers and forest owners (Technical and forestry experimentation centre - CETEF of South Normandy)
<b>Link from OGs database</b>	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/raison-r%C3%A9seau-dadaptations-dinnovations-sylvicoles">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/raison-r%C3%A9seau-dadaptations-dinnovations-sylvicoles</a>
<b>Country, region, city</b>	France, Normandy, Saint Etienne du Rouvray
<b>Type of innovation</b>	Process
<b>Keywords</b>	silviculture, experimentation, wood mobilization, costs, thinning systems
<b>Approach and main results</b>	<p>The stakes of a first thinning cut in a plantation are high. Thinning is necessary at around twenty years of age, in order to reduce the density in favour of future trees and thus encourage their growth in diameter. However, there are many delays in carrying out this first cut, with consequences for the quality of the stand (development of epicormics, stressed trees, etc.). The reasons given for this delay in thinning are the cost of the operation and the difficulty for owners to find skilled labour. Various alternative solutions could make it possible to carry out these thinnings at lower cost. QD (qualification-dimensioning) silviculture, in particular, aims to designate a limited number of future stems in order to limit the number of interventions in the plot. One of the aims of the RAISON project was to assess the economic and silvicultural benefits of managing a young deciduous stand using low-density designation and routing compared with conventional silviculture based on full thinning. A property located in the commune of Valdallière was selected by CETEF members to set up a system on a 1.31 hectare plot, with the main species being common beech (75%) planted in a mixture with chestnut (25%). The planting pattern alternates between rows of 2 m and 4 m, making it easier to clear and prune the trees. In 2016, the trees ranged from 8 to 15 cm in diameter and 7 to 9 m in height. The stand has been subject to two successive reserve markings, the first aimed at favouring beech trees and the second at favouring future stems.</p> <p>The plot was divided into 4 blocks of 0.3 ha, each allowing a different management method to be tested. Management method "a" was based on full thinning, "b" on low-density designation (QD silviculture) and clipping, "c" on low-density designation and ring-barking, and "d" was a control with no intervention.</p> <p>There were no replications of any of the methods. To avoid the edge effect, the two outermost lines of each plot were not measured. The plots were marked with stakes and the isolation strips were marked with a line 1.30 m apart on the outside trees closest to the measurement plot. Future trees were also specifically marked. The variables measured were circumference at 1.30 m, a rating of the epicormic trees, and a description of the social status of the</p>

	<p>objective trees. The total height, the height of the base of the leafy crown, and the average radius of the crown are noted on the 10 largest designated stems. The stand is also monitored, with estimates of density, basal area, and thinning. This estimate is made within a 10 meter radius of a designated tree near the centre of each plot.</p> <p>The data measured on the objective trees, the epicormic area, and the height of the 10 largest trees will be analysed to see whether the interventions maintain growth and whether the initial diameter is a true reflection of vigour, to see the impact of the interventions on the quality of the objective trees and to quantify the tree balance parameters.</p> <p>Finally, monitoring the time and cost of the interventions, as well as the revenue generated, will enable an economic comparison of the different methods.</p>
<p><b>Lessons learned</b></p>	<p>35 to 40 "option" trees have been identified and marked out. They will be monitored individually until the final stand is harvested, ideally by taking measurements every three years at the beginning and then before each thinning. The first thinning of the "a" and "b" modalities and the girdling of the "c" modality was carried out in the 2nd half of 2022. Each sub-plot will be regularly maintained in accordance with the planned protocol. As tree growth is not linear over time, it is desirable for the monitoring of such an experiment to last until the stand is harvested. Of course, the experiment will produce results well before the harvest, but these results will only relate to the period measured and cannot be extrapolated over the entire life of the stand. Experimenting with different management methods is a long-term process for the forest and requires long-term sources of funding to enable the stands to be monitored.</p>
<p><b>Contact information</b></p>	<p>Mr Romain MANI - CNPF.  Contact informations : <a href="mailto:romain.mani@cnpf.fr">romain.mani@cnpf.fr</a></p>
<p><b>Links to website/report/video</b></p>	<p><a href="https://hautsdefrance-normandie.cnpf.fr/projet-raison">https://hautsdefrance-normandie.cnpf.fr/projet-raison</a></p>
<p><b>Pictures</b></p>	<div data-bbox="533 1520 1112 1906" data-label="Image"> </div> <div data-bbox="1134 1520 1469 1671" data-label="Caption"> <p>Title : Ringing of an aspen in favour of an oak.  Copyright : Samuel Pont © CNPF.</p> </div>

## ITHub 1 - 10

<b>Title of innovation</b>	<b>Innovative method for maintaining the quality of round and processed wood by controlling temperature and humidity</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	CNPF
<b>Operational Group (short name)</b>	CoolWood (r)
<b>Operational Group (name)</b>	CoolWood (r) : Innovative method for maintaining the quality of round and processed wood by controlling temperature and humidity
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest owners, Forest managers, advisors, Wood mobilisers, Primary wood processing, Forest/wood research laboratories
<b>Link from OGs database</b>	
<b>Country, region, city</b>	France, Bourgogne - Franche Comté
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Forestry, Supply chain, market and consumption, wood storage Quality of round and semi-processed woods Fungi, bacteria, insect larvae Storms, forest epidemics Alternative to spraying wood with water
<b>Approach and main results</b>	<p>The biological degradation of wood is a permanent risk for the entire industry.</p> <p>From the time the trees are felled in the forest to the time the timbers are dried, the quality of the wood stored is constantly called into question by attacks of biological origin (fungi, bacteria, etc.).</p> <p>As a result, wood products can lose some or all their market value, and this problem is exacerbated in emergency situations (storms, epidemics, etc.).</p> <p>Current wood protection techniques remain unsatisfactory.</p> <p>There are currently three main techniques for maintaining wood quality:</p> <ul style="list-style-type: none"> <li>+ Wet protection (sprinkling, immersion),</li> <li>+ Preservation by ensilage (under tarpaulin),</li> <li>+ Chemical treatment.</li> </ul> <p>None of them is fully satisfactory (lack of technical efficiency, constraints, high economic and environmental cost, etc.).</p>

CoolWood®: an innovative storage process.

The CoolWood® process is a new technology for maintaining wood quality.

Logs are stored in an enclosure that is maintained at :

- + At a low temperature, to block the action of degrading biological agents,
- + At a high level of humidity, to slow down the drying of round wood and prevent deformation (splitting and cracking).

CoolWood®: an industrial research programme.

The development of the CoolWood® process was the subject of an industrial research programme from 2013 to 2017.

The programme, funded by the French National Research Agency (ANR) and the Lorraine Region, involved eight partners:

- + Four public laboratories (Université de Lorraine, AgroParisTech / INRA, CNRS),
- + Four private companies (Biomasse Conseil, forestry cooperative F&BE, CDC Forestry Company, Inddigo).

Results of our work.

The process maintains a better quality of wood than other methods (water spraying in particular) and the energy requirements of the process are relatively modest: 25 to 40 kW of maximum power demand for 1,000 m<sup>3</sup> of stored wood.

Industrial applications of the process.

Four industrial applications have been identified for the "CoolWood®" process, at different stages of the supply chain, from logging to drying:

- + Emergency storage, to manage emergencies caused by natural hazards,
- + Logistics platforms, to organise the mobilisation of timber and regulate commercial flows,
- + Logyards and industrial logyards, to maintain the quality of round timber,
- + Sawn timber yards, to maintain the quality of wood after processing.

PEI-AGRI 2022 - 2024 project.


The CoolWood® project is currently the subject of a PEI-AGRI project with the following partners:

- + SARL Biomasse Conseil, owner of the process and the driving force behind its development,
- + The forestry cooperative F&BE (Forêts et Bois de l'Est),
- + Scierie Genet, which mainly processes beech, a species that is highly susceptible to degradation,
- + SAS Cebi 45, a consultancy specialising in energy and thermal engineering.

At the current stage of the project (August 2023)...

A sawmill has installed an industrial cold room for storing sawn timber.

We can disseminate the process in industry by creating turnkey installations.

<b>Lessons learned</b>	<p>The added value of the entire timber industry is significantly reduced by attacks from biological agents that deteriorate freshly felled timber. After 5 to 6 months of summer storage, the depreciation of products sawn from these logs can represent up to 13% for oak and 30% for fir and spruce.</p> <p>In France and Europe, we are witnessing a massive deterioration in the health of trees, which will have to be harvested at a rate higher than that of industrial processing. It will therefore be necessary to store large volumes of wood, but the technique most used until now - continuous spraying of wood with water - is encountering increasing difficulties as water availability decreases.</p> <p>The advantages of the CoolWood® process over existing technologies (water spraying in particular): better quality of the wood stored, reduced raw material losses, simplified logistics, use of renewable energy sources, environmental protection, flexibility (variety of storage sites), adaptability to the volumes to be stored, self-sufficiency of the facilities (energy), possibility of visually assessing the wood.</p>
<b>Contact information</b>	<p>CoolWood® is a registered trademark Biomasse Conseil.          Biomasse Conseil Luc EVRARD          4 rue Pierre Curie 88110 RAON-L'ETAPE          Tel: 09 84 28 92 90 / 07 82 24 84 22          Web : <a href="http://www.biomasse-conseil.fr">www.biomasse-conseil.fr</a>          E-Mail: <a href="mailto:luc.evrard@biomasse-conseil.fr">luc.evrard@biomasse-conseil.fr</a></p>
<b>Links to website/report/video</b>	<p><a href="https://coolwood.fr/">https://coolwood.fr/</a></p>
<b>Pictures</b>	

## ITHub 1 - 11

<b>Title of innovation</b>	<b>Adaptation and deployment of the "La Forêt Bouge" toolbox</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	CNPF
<b>Operational Group (short name)</b>	Sylviconnect
<b>Operational Group (name)</b>	Sustainable, high-performance forestry for Brittany
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	advisors, businesses, public decision-makers
<b>Link from OGs database</b>	<a href="https://www.reseaurural.fr/centre-de-ressources/projets/sylviconnect-une-sylviculture-durable-et-performante-pour-la-bretagne">https://www.reseaurural.fr/centre-de-ressources/projets/sylviconnect-une-sylviculture-durable-et-performante-pour-la-bretagne</a>
<b>Country, region, city</b>	France, Bretagne
<b>Type of innovation</b>	Social innovation
<b>Keywords</b>	services and reception, innovative tools, economy, cooperation, research and innovation
<b>Approach and main results</b>	In the years leading up to the project, Brittany's forestry and wood industry was involved in the development of three main markets (construction, packaging and wood energy), as well as in wood processing using sawmills, and in ensuring the sustainability of timber resources through the Breizh Forêt Bois initiative. There is a need for structuring action, particularly in forestry and forestry work. This will require a better understanding of the sector's activities and needs, in order to facilitate contacts with the other links in the chain (owners and trainers) and to set up appropriate training and support for innovation. The aim of the project was to strengthen the position of forestry professionals in Brittany, with a view to optimising the supply chain. In particular, this work has involved adapting and deploying the "la forêt bouge" toolbox, with the aim of adapting it to the regional context of Brittany, as well as improving its functionality by adding new modules where necessary. The "La forêt bouge" service site targets forest owners and professionals in the forestry and wood industry. It aims to promote contact between the various stakeholders (private, economic or institutional) in the forestry sector. This tool enables them to facilitate procedures, forest management, and silvicultural operations by encouraging the grouping of management and/or land ownership. It aims to develop the mobilisation of wood

	<p>in private forests through innovative services and access to news and popularisation documents. Stakeholders can create their own account and access tailored, individualised services more quickly. This project is a collaborative effort involving all the players in the forestry and wood industry. It is based on three strategies, firstly by defining a common foundation, then by testing the adaptation of the tool in four pilot regions and finally by implementing the tool in all the regions of France. The adaptation of the tool in the "Pays de la Loire" pilot region was carried out by the Sylviconnect operational group. The deployment of the "La Forêt bouge" tool was only able to be carried out imperfectly in the final year of the project, due to its dependency on national deployment and decisions. Nevertheless, all the editorial work and the creation of content, particularly on prices (for wood in forests and for forestry work) and good operating practices, have enabled significant progress to be made in the consultation of stakeholders in Brittany.</p>
<b>Lessons learned</b>	<p>The development of the La Forêt bouge platform and, in particular, its regional office in Brittany, will ultimately provide a much better link between forest owners and forestry companies. Until now, forest owners simply didn't have access to the contact details of professionals depending on the type of work they needed. This tool, coupled with the database of professionals in the sector, will make it easier to put people in touch with each other and should help to improve the management or re-management of small forest plots. The platform also has a strong educational dimension, providing a wealth of information about the forest, forestry operations and the regulations that apply, as well as disseminating best practices. In a few years' time, this platform should be the key tool for forest owners and players in the industry.</p> <p>The process has been slow to get off the ground because of delays in development. Some of the functionalities developed at the regional level in Brittany are used as references at the national level. The meetings that have been held have also helped to build a collective driving force on the subject. However, all these actions need to be sustained over time if they are to have a real long-term impact on the forest.</p>
<b>Contact information</b>	
<b>Links to website/report/video</b>	
<b>Pictures</b>	

## ITHub 1 - 12

<b>Title of innovation</b>	<b>Technique for superficial heat treatment on wood product</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	CNPF

<b>Operational Group (short name)</b>	Noir&Sens
<b>Operational Group (name)</b>	Noir&Sens Technique for superficial heat treatment on wood product
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest owners, Forest managers, advisors, Primary wood processing, Architects
<b>Link from OGs database</b>	<a href="https://www.reseaurural.fr/centre-de-ressources/projets/noir-sens-valoriser-par-traitement-thermique-superficiel-les-bois">https://www.reseaurural.fr/centre-de-ressources/projets/noir-sens-valoriser-par-traitement-thermique-superficiel-les-bois</a>
<b>Country, region, city</b>	France, Centre
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Forestry, Supply chain, market and consumption, wood product, heat treatment, design, architect
<b>Approach and main results</b>	<p>Today, to increase the lifespan of wood products outdoors, it is necessary to add chemicals that are often polluting and make recycling difficult. The use of surface-burned wood is very old, dating back to prehistoric times when our ancestors burned the tips of stakes to make them harder and make tools and weapons for hunting. This technique has also been used by farmers in many countries to make the tips of stakes, fences or vine stakes rot-proof. This technique was used all over the world and particularly in Japan, for the construction of houses, under the name Shou-sugi-ban or Yakisugi.</p> <p>Furthermore, in large markets such as construction, furniture, packaging and garden landscaping, regional woods have their strengths and limitations. Thus, secondary quality oaks, poplars but also other various species must find new outlets generating more added value for all stakeholders, producers and processors.</p> <p>The Noir&amp;Sens project aims to :</p> <ul style="list-style-type: none"> <li>- develop an industrial tool for the surface heat treatment of wood that is efficient, reliable, flexible and with low energy consumption,</li> <li>- make it possible to disseminate this technique to wood processing companies,</li> <li>- identify the markets and products on which secondary quality surface-burned regional wood has sufficient added value to be competitive,</li> <li>- create and design new ranges of products thus valued.</li> </ul> <p>The results of the project are as follows:</p> <p>1-Pre-study of areas of interest in surface heat-treated wood.</p>

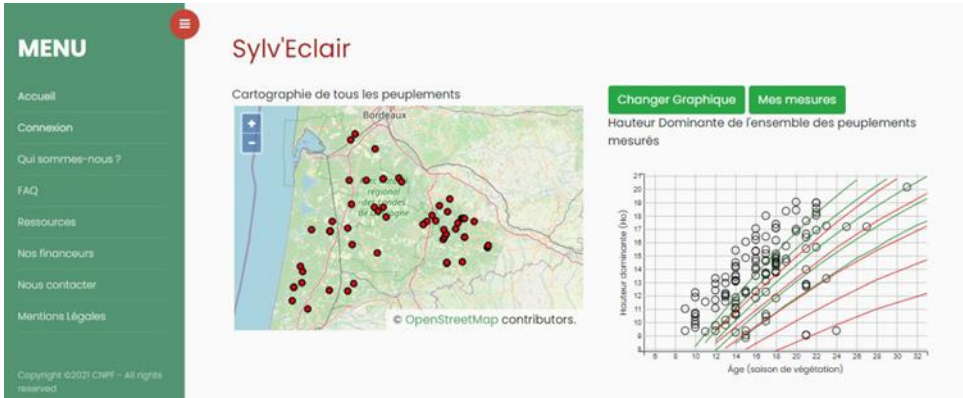
	<p>2-Study of potential markets and competitiveness of the process: - Exterior fittings and furniture, cladding, street furniture, vegetable gardens, composters, garden centers, pots, fences, benches, etc. - Interior fittings and furniture, decoration, design, interior architecture, kitchen, panels...</p> <p>3-Tests and optimization of surface heat treatment techniques for soft wood parts for oak, poplar and pine wood.</p> <p>4-Product qualification: not established for sustainability</p> <p>5-Development of a flexible industrial tool for surface heat treatment of wood.</p> <p>6-Creation of a prototype.</p> <p>7-Estimation of the cost price of the treatment, of the added value brought to the products.</p> <p>8-Design of one or more competitive product ranges meeting market expectations. Choice of outdoor use where burning provides real added value in terms of natural protection.</p> <p>9-Diffusion of innovation during exhibitions, competitions, Paris Design Week, etc.</p>
<p><b>Lessons learned</b></p>	<p>Noir &amp; Sens has made it possible to develop an optimized industrial process for surface burning of wood, economical in cost and energy, making it possible to obtain a high-performance product in terms of durability, use and aesthetics for outdoor use.</p> <p>Additional durability is provided by the heat treatment of the wood under the thin carbonized layer. Surface carbonization provides an interesting aesthetic but is difficult to stabilize over time, particularly on south-facing facades for cladding. Requires treatment on 2 opposite sides to prevent curling and 6 sides for complete protection.</p> <p>The burning prototype is aimed at sawyers to promote less durable local wood and at secondary processing companies for finished products.</p> <p>Finished burnt wood products are aimed at architects, planners, landscapers, gardeners, communities and individuals for outdoor use, interior designers, decorators and individuals for interior products.</p> <p>It is now needed to find a machine tool manufacturing company to market the prototype.</p>
<p><b>Contact information</b></p>	<p><a href="mailto:e.delarochere@fibois-cvl.fr">e.delarochere@fibois-cvl.fr</a></p>
<p><b>Links to website/report/video</b></p>	<p><a href="https://www.fibois-cvl.fr/recherche-et-developpement/noir-sens/">https://www.fibois-cvl.fr/recherche-et-developpement/noir-sens/</a></p>

<p><b>Pictures</b></p>	
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## ITHub 1 - 13

<b>Title of innovation</b>	<b>Sylv'éclair a decision support tool for thinning in pine plantation</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	CNPF
<b>Operational Group (short name)</b>	SPNA
<b>Operational Group (name)</b>	SPNA : Precision silviculture in Nouvelle-Aquitaine
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	forest owners, researchers, advisors
<b>Link from OGs database</b>	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/sylviculture-de-pr%C3%A9cision-en-nouvelle-aquitaine.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/sylviculture-de-pr%C3%A9cision-en-nouvelle-aquitaine.html</a>
<b>Country, region, city</b>	France, Nouvelle-Aquitaine
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Forestry, Decisional support system, Digital platform, Precision forestry

<p><b>Approach and main results</b></p>	<p>Design and development of an application to trigger thinnings in maritime pine stands and development of a database through "participative silviculture" via the same application.</p> <p>Thinnings help maintain the good growth of a forest stand, improve its quality and provide intermediate income. For the forest-timber sector, thinnings guarantee the qualities and quantities of wood that will be produced in the future. Finally, regular and well-performed thinnings, as well as careful planting and appropriate mechanical clearing, are the guarantee of good resistance of populations to climate change.</p> <p>The Landes de Gascogne massif is at a very special moment in its history. After two major storms, Martin in 1999 and Klaus in 2009, the last decades have mainly been devoted to cleaning and then rebuilding the stands. In certain properties, there was a delay in carrying out thinnings. At the same time, maritime pine prices encourage the mobilization of wood. This sometimes results in cuts made to the detriment of the future of the population : By triggering thinning too early or too late on certain plots, or too intense on others.</p> <p>In this context, each owner must be able to quickly diagnose each of their stands using simple tools to determine when and how to implement the next thinning. This decision support tool is based on the work of Jean-Paul Maugé carried out on the Maritime Pine in the 1980s. The limits defined by J.-P. Maugé correspond to a compromise between production maximum stand and individual growth of each tree. For a given circumference, these tables make it possible to determine a minimum density and a maximum density between which the population must be located. When the real density is greater than the maximum limit, it is necessary to clarify and bring this density to a value close to the minimum limit. These limits remain adapted to the maritime pine populations present today in the Landes de Gascogne Massif. The tool is suitable for all types of terrain. The only thing that changes is the age at which thinning occurs. Thus, the operation will be triggered later in plots installed on dry moors than for those located on more favorable moors. Current populations mostly benefit from genetic improvement and dynamic silviculture. They therefore arrive earlier at the thinning trigger circumferences. A mobile tool on smartphones will soon be available. It will be very easy to use by as many people as possible. In the event that thinning must be initiated, the diagnosis will indicate the dendrometric characteristics of the stand and the number of stems to be sampled. The tool will also remind you of the instructions concerning the organization of cutting and marketing. If thinning has to wait, the application will indicate the recommended intervention date.</p>
<p><b>Lessons learned</b></p>	<p>SYLV'ÉCLAIR and its database developed as part of the SPNA project are designed to collect data from stands made up mainly of maritime pine and provide advice adapted to them. However, the tool is designed so that any other forest species (Douglas fir, laricio pine, Scots pine, etc.) managed in regular high stands can be integrated provided that it is equipped with forest standards and a growth model. Furthermore, if the first testing phases of this interface mainly take place</p>

	in populations of the Massif des Landes de Gascogne, the tool is intended to be used throughout the national territory.
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<b>Links to website/report/video</b>	<a href="https://nouvelle-aquitaine.cnpf.fr/sites/socle/files/cnpf-old/article_eclaircie_pm.pdf">https://nouvelle-aquitaine.cnpf.fr/sites/socle/files/cnpf-old/article_eclaircie_pm.pdf</a>
<b>Pictures</b>	 <p>Screenshot of the “Sylv’éclair” demonstration web interface - SPNA prototype site</p>

## ITHub 1 - 14

<b>Title of innovation</b>	<b>Mechanical structural classification for Pinus pinaster ssp atlantica in the northern Iberian Peninsula approved by the European Normalization Committee.</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	Cesefor
<b>Operational Group (short name)</b>	OG SIGCA
<b>Operational Group (name)</b>	SiGCa: Forest management systems in quality timber producing forests
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest Owners

<b>Link from OGs database</b>	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/sigca-sistemas-de-gesti%C3%B3n-forestal-en-bosques.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/sigca-sistemas-de-gesti%C3%B3n-forestal-en-bosques.html</a>
<b>Country, region, city</b>	Basque Country, Cantabria, Asturias, Galicia and Castilla León
<b>Type of innovation</b>	Process
<b>Keywords</b>	Forest industries; wood mobilization
<b>Approach and main results</b>	<p>For the first time for maritime pine wood of Spanish origin, mechanical structural grading tools have been developed, which will allow maritime pine wood to be classified into C24 and C18 classes. Mechanical grading is based on the use of equipment for measuring physical and/or mechanical parameters in the wood, which allows different strength and stiffness values to be assigned directly, without the need to destroy or alter the wood or to carry out a detailed visual classification of the piece.</p> <p>These machines are widely developed throughout Europe, as they optimise the mechanical properties to be declared, as they have excellent prediction levels, and greatly improve classification times. Despite this, they are practically non-existent in Spain.</p>
<b>Lessons learned</b>	<p>During the process, it was found that the maritime pine wood obtained resistance classes: C30, C27, C24, C18 and C16, which allow the industry's resource to be optimised to the maximum.</p> <p>It was also found that mechanical grading with respect to structural visual grading improves yields. Specifically, with respect to the visual classification stipulated in the Spanish standard UNE 56546, the mechanical classification improves performance by 30% with respect to the visual classification.</p> <p>It was also found that although the UNE-EN 56544 standard only allows classification for maritime pine C-27 and C-18, with the mechanical classification it has been possible to classify up to C30, which also means an improvement in mechanical properties.</p>
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<b>Links to website/report/video</b>	<a href="https://www.sigcamaderadecalidad.info/">https://www.sigcamaderadecalidad.info/</a>
<b>Pictures</b>	

## ITHub 1 - 15

<b>Title of innovation</b>	<b>LVL (Laminated Veneer Lumber) of fagus silvatica</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	Cesefor
<b>Operational Group (short name)</b>	OG FAGUS

<b>Operational Group (name)</b>	Operative Group FAGUS: Adding value to beech trees through innovation and improving the competitiveness of their forest industry value chain.
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest Owners
<b>Link from OGs database</b>	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/grupo-operativo-fagus-puesta-en-valor-del-haya.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/grupo-operativo-fagus-puesta-en-valor-del-haya.html</a>
<b>Country, region, city</b>	Navarre, Basque Country, Castile and Leon, La Rioja.
<b>Type of innovation</b>	Product
<b>Keywords</b>	Forest industries; wood mobilization
<b>Approach and main results</b>	<p>A new LVL product has been developed and tested using beech veneer from Spain. This product did not exist before and it is hoped that with its development, the beech wood value chain can be revalued.</p> <p>LVL is a product that consists of the successive stacking of thin layers of wood, veneers, obtained by unrolling. Obtaining the material in this way has the following implications:</p> <ul style="list-style-type: none"> <li>- Beech veneers used for the manufacture of LVL The raw material for the manufacture of this product is high quality logs. Large diameters, straight, with little taper and knots in order to obtain an adequate yield, volume and quality during unrolling. For this reason, it is to be expected that the manufacture of structural products with peeled veneer will offer superior properties to sawn timber of the same species.</li> <li>- Bending tests have been carried out on small dimension and structural size specimens, as well as tensile tests perpendicular to the fiber. The results of the tests are satisfactory and encouraging, achieving good mechanical properties that indicate that the raw material is suitable for the production of this product. Comparing the properties of LVL tested in bending with those of sawn timber from the same source, the results have been improved in both bending strength and stiffness.</li> </ul>
<b>Lessons learned</b>	It has been observed that the bending strength of LVL is higher than that of the tested sawn timber sample. This is consistent with the fact that engineered wood products such as LVL improve the properties of sawn timber due to the better use of the material and the reduction of singularities in the structural elements. If we now analyse the results of the bending tests performed on small specimens, we can see, as expected, that these samples are stronger and stiffer than those of structural size. In particular, the ratio between strengths is 1.67, and in the overall modulus of elasticity 1.43. This can be explained by the lower amount of singularities that small-sized wood has compared to structural-sized wood. On

	the other hand, the pressing process with the hot plate press, used to produce the panels from which the small dimension specimens were obtained, has a higher degree of control than that carried out with the large press used to produce the structural size beams. The latter may also influence the better results obtained with the small specimens. Finally, with regard to the results of the tensile tests perpendicular to the fibre, it can be commented that the characteristic strength value obtained of 0.94 MPa is higher than that indicated for all hardwood D strength classes in the EN338 standard, which corresponds to 0.6 MPa.
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<b>Links to website/report/video</b>	<a href="https://gofagus.es/">https://gofagus.es/</a>
<b>Pictures</b>	

## ITHub 1 - 16

<b>Title of innovation</b>	<b>Visual structural grading tool and a mechanical structural grading tool</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	Cesefor
<b>Operational Group (short name)</b>	GO FAGUS
<b>Operational Group (name)</b>	Operative Group FAGUS: Adding value to beech trees through innovation and improving the competitiveness of their forest industry value chain.
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest Owners
<b>Link from OGs database</b>	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/grupo-operativo-fagus-puesta-en-valor-del-haya.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/grupo-operativo-fagus-puesta-en-valor-del-haya.html</a>
<b>Country, region, city</b>	Navarre, Basque Country, Castile and Leon, La Rioja.
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Forest industries; wood mobilization

<b>Approach and main results</b>	<p>For the first time, structural grading tools have been developed for beech wood of Spanish origin. This will allow beech timber to be used for structural products: beams, pillars, glued laminated timber, etc.</p> <p>Specifically, a structural visual grading and a mechanical grading have been developed. The structural visual grading consists of a wood industry operator who, on the basis of visual observation criteria of each piece of wood, can declare a resistance class.</p> <p>On the other hand, mechanical grading consists of the determination of a strength class with the use of a grading machine, which, based on the density of the wood and the natural vibration frequency of the piece, is able to determine the strength class. Finally, the results obtained in the reports will be submitted to the European committee for approval so that it can be used by the industry.</p>
<b>Lessons learned</b>	<p>During the process, it has been found that beech wood obtains better resistance classes than the Spanish conifers approved for use in structures within the UNE 56544 Standard. Specifically, resistance classes ranging from D45 to D24 were obtained.</p> <p>It was also found that the structural visual classification according to the Spanish standard UNE 56546 obtained 75% of wood suitable for use in structures, which allows to expand the customer market.</p> <p>In the process, a modification of the UNE 56546 standard has also been proposed, for the improvement of yields, with this modification, higher graded wood yields are obtained (84% of MEF wood corresponding to a CR D35). On the other hand, modification 2 establishes a high percentage of high structural quality wood (44% of MEF A class), with an added value corresponding to CR D45, to which we must add 40% of CR D35 and 16% of rejected wood.</p>
<b>Contact information</b>	<a href="mailto:joseluis.villanueva@cesefor.com">joseluis.villanueva@cesefor.com</a>
<b>Links to website/report/video</b>	<a href="https://gofagus.es/">https://gofagus.es/</a>
<b>Pictures</b>	

## ITHub 1 - 17


<b>Title of innovation</b>	<b>Wood potentially available for harvesting activities</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	UNIFI
<b>Operational Group (short name)</b>	Shared PRiVate FOReSt MANagement in Eastern Alps
<b>Operational Group (name)</b>	PRI.FOR.MAN

<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest companies, advisors, research institutions
<b>Link from OGs database</b>	<a href="https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali">https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali</a>
<b>Country, region, city</b>	Italy, Friuli Venezia Giulia
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Forestry, Remote Sensing data, digital platform, Decisional Support System, wood mobilization, new value chain, Sustainable Forest Management
<b>Approach and main results</b>	<p>Understanding the volume that can truly be harvested using mechanical means is of paramount importance in assessing the real value of forest utilization. In this context, it is necessary to develop methodologies that enable companies to identify areas of higher value. In Italy, several methodologies for assessing accessible areas have been developed in the research field, but none have been applied at a regional scale.</p> <p>In this context, the GO-PRI.FOR.MAN has applied a methodology for calculating the volume that can actually be harvested, using slope data derived from the digital terrain model and a regional map of wood volume derived from the integration of LiDAR remote sensing data and national forest inventory data as input. Additionally, operational limits of the extraction systems commonly used by companies (cable cranes and tractors) were considered, along with topographic limits (slope change). For example, it's not possible for a cable crane to cross a ridge or work simultaneously up and down a slope.</p> <p>Indeed, in this context, the project aimed to provide a comprehensive assessment of the actual harvesting potential of forested areas, taking into account both natural terrain characteristics and the capabilities of the machinery used in logging operations. This approach helps companies identify areas with the highest potential for profitable utilization. For the first time in the wall Region of Friuli-Venezia Giulia Region it is possible to have access to this information.</p> <p>Quantifying the amount of potential wood harvesting compared to the available supply is an important factor in calculating the amount of wood that can be extracted from a specific forest area.</p>
<b>Lessons learned</b>	To quantify the volume that can actually be harvested, a series of regional-scale geographic layers are required. These layers, thanks to new methodologies, including the integrated use of ground-based and remote sensing data, allow for the application of research-developed methodologies in operational contexts, such as in the Friuli Venezia Giulia region.

	The integration of various geographic layers, including terrain data, wood volume data derived from remote sensing, and ground-based data, enables a more accurate and comprehensive assessment of the actual harvestable volume in a region. These advancements in data collection and analysis methods have made it possible to apply research findings and techniques to practical forestry operations, allowing for a more informed and efficient approach to forest resource management in the Friuli Venezia Giulia region.
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<b>Links to website/report/video</b>	<a href="https://www.legnoservizi.it/pri-for-man-dss-un-sistema-di-supperto-delle-decisioni-forestali-a-scala-locale/">https://www.legnoservizi.it/pri-for-man-dss-un-sistema-di-supperto-delle-decisioni-forestali-a-scala-locale/</a>
<b>Pictures</b>	

## ITHub 1 - 18

<b>Title of innovation</b>	<b>MOTI</b>
ITHub	1
<b>FOREST4EU partner (short name)</b>	GIS
<b>Operational Group (short name)</b>	DIGIGOZD
<b>Operational Group (name)</b>	Digitalization of agricultural holdings for forest management planing
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	farmers, forest owners, researchers, advisors, businesses, environmental groups
<b>Link from OGs database</b>	-
<b>Country, region, city</b>	Slovenia
<b>Type of innovation</b>	Service
<b>Keywords</b>	Calculations, costs, web-tool, optimization, model, wood mobilization

<b>Approach and main results</b>	Moti is a mobile application that can be used to measure standing stock, tree height, tree composition, number of trees per hectare and timber stock. MOTI calculates the timber stock based on the standing stock, calculated with the Bitterlich angle counting method, and the measured standing height and shape of the trunk. The application has a built-in automatic correction of the calculation due to the slope of the terrain. The measurements of the logbook with the MOTI application are not significantly faster than manual measurements, but we save a lot of time when calculating the wood stock and transferring and processing the data, since MOTI allows immediate calculation of the wood stock in the field.
<b>Lessons learned</b>	Compared to classical methods of measurement, the application has many advantages. Smart devices offer ever-improving optics, contrast screens with the ability to enlarge the image, which is especially important for measurements of the existing baseline, when by enlarging the image, you can quickly we find out whether a certain tree still exceeds the selected viewing angle or not. Enlarging the image is very useful even in conditions of poor visibility, when by zooming in on the image on the phone or tablet, we can quickly check what is several tens of meters away from us and whether another tree might be hiding behind the tree.
<b>Contact information</b>	<a href="mailto:info@digigozd.si">info@digigozd.si</a>
<b>Links to website/report/video</b>	<a href="http://digigozd.si/aplikacija-moti/">http://digigozd.si/aplikacija-moti/</a>
<b>Pictures</b>	

## ITHub 1 - 19

<b>Title of innovation</b>	<b>SiWaWa</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	GIS
<b>Operational Group (short name)</b>	DIGIGOZD


<b>Operational Group (name)</b>	Digitalization of agricultural holdings for forest management planing
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	farmers, forest owners, researchers, advisors, businesses, environmental groups
<b>Link from OGs database</b>	
<b>Country, region, city</b>	Slovenia
<b>Type of innovation</b>	Service
<b>Keywords</b>	Calculations, costs, web-tool, optimization, model, wood mobilization
<b>Approach and main results</b>	As part of the MOTI mobile application, a SiWaWa simulator has been created, which shows us the development of forests in the next 30 years. SiWaWa is intended for the simulation of development in one-dimensional and pure stands, where the parameters are like average stands. With the help of the SiWaWa application, we determine the type, amount, and time of implementation of silvicultural measures for a certain stand. We can decide based on the set wood prdouction goals, which measure makes the most sense and what we will achieve with it.
<b>Lessons learned</b>	For the owner, data such as wood production goals or measures are important when planning the yield of the forest. The newer version of the SiWaWa growth simulator is available as a stand-alone mobile application, allowing the owner to obtain simulation results while in the field, directly after recording a stand with the MOTI application.
<b>Contact information</b>	<a href="mailto:info@digigozd.si">info@digigozd.si</a>
<b>Links to website/report/video</b>	<a href="#">DIGIGOZD - Projektna stran EIP projekta PRP DIGIGOZD</a>
<b>Pictures</b>	

## ITHub 1 - 20

<b>Title of innovation</b>	<b>Online tool for quality classification of round-wood</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	GIS
<b>Operational Group (short name)</b>	eGOZD
<b>Operational Group (name)</b>	Electronic management of agricultural holdings with emphasis on forestry activity
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	forest owners, researchers, advisors
<b>Link from OGs database</b>	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/elektronsko-poslovanje-kmetijskih-gospodarstev-z.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/elektronsko-poslovanje-kmetijskih-gospodarstev-z.html</a>
<b>Country, region, city</b>	Slovenia
<b>Type of innovation</b>	Service
<b>Keywords</b>	Forestry, Supply chain, market and consumption, wood product conservation
<b>Approach and main results</b>	<p>The online tool for quality classification of roundwood is intended for all users who want to conveniently determine the quality of roundwood and simultaneously gain knowledge about the evaluation of roundwood assortments. The information may be helpful for forest owners who aim to increase the utilisation of wood from their forests by using the quality criteria for the roundwood assortments.</p> <p>Slovenia's geographical region in the moderate climate zone enables the cultivation and production of timber products of high quality. Due to its natural resources, it is not sensible to strive for mass production of wood but rather for directed cultivation and production of assortments of higher quality, which are consequently classified in a higher price range. Poor knowledge or round wood classification according to quality classes can ultimately devalue the quality of timber and work achieved through tending in the long-term process of silviculture.</p> <p>The project has developed guidelines for forest owners to collect information for the correct measurement of dimensions and the rules for calculating the volume of round wood. Typical values of the bark thickness are given for each tree species, which is not considered when calculating the diameter. Furthermore, roundwood quality classes for Slovenia's most common soft- and hard-woods</p>

	<p>are presented. In the case of soft- and hard-wood species, we emphasise the quality measures for spruce, fir and beech. The guidelines for measuring dimensions, the rules for calculating the volume and the quality classification of logs are based on the standards and rules that apply to the broader European area. Thus, European standards (SIST EN 1309) and "Rules of Good Practice" as given by the German Forestry and Wood Processing Industry Council were used as the primary literature. Both standards define four quality classes of logs (A, B, C, D). In the past, the Slovenian standards of classifying roundwood defined assortments according to the purpose of use. In our case, however, the standards define only the quality from the best (A) to the low-quality logs (D) without a specific purpose. It is then left to the wood users to choose the most suitable class according to their needs. Traditional Slovenian classification rules also define dimensional requirements for an individual quality class, while dimension classes are entirely separate in the case of European or German quality grading. We also included indicative dimensional requirements for each quality class in the article, so we still needed to completely break the link between the Slovenian traditional classification and European rules.</p> <p>Using the online tool for quality classification of roundwood the forest owners get know-how on wood defects. Quality is usually determined by stating the maximum number and size of permissible defects that an assortment may still have in order to achieve a certain quality class. Wood defects spoil some of its properties and thus reduce its usefulness. Wood defects have different origins. They are formed due to the unfavourable influence of the natural site on the development of the tree or due to mechanical damage during the process of wood production. In the case of wood defects, we must know how to properly identify and define them. To determine its size, knowing the agreed method of measuring the defect is necessary. Last but not least, it is also necessary to determine the degree of defect influence for each defect, which consequently affects the classification of the assortment into a certain quality class. Wood defects that affect the quality of wood are the most important when defining assortments. When bucking, we estimate those defects of the wood that are noticeable on the circumferential surface and the cross-section of the trunk. Based on these, we also conclude on the wood quality of the trunk.</p>
<b>Lessons learned</b>	Knowing wood defects is important in direct trunk bucking. Knowledge of how to eliminate the defect, how to reduce the impact of the defect, where to make demarcations between assortments of different quality and where to cut is a key element of bucking. In this way, we influence the quality and value of an individual assortment.
<b>Contact information</b>	<a href="mailto:gteinfo@gozdis.si">gteinfo@gozdis.si</a>
<b>Links to website/report/video</b>	<a href="http://www.mojgozdar.si">www.mojgozdar.si</a>

## Pictures



Sortimentacija
Seznam sortimentacij

Trenutni kakovostni razred: **B**

Volumen sortimenta: 0,51m<sup>3</sup>

Zrasle grče

Nezrasle grče

Ekscentričnost

Krivost

Koničnost

Čelne razpoke

Kolesivost

Insekti

Trda trohnoaba

Mehka trohnoaba

Obarvanost

Prisotnost podlubnikov

### 3. Lastnosti hloda

#### 1/12 Zrasle grče [cm] ⓘ

Izmerimo premer največje zrasle grče na hlodu v centimetrih. Merimo najmanjši premer grče, brez upoštevanja vejnega ovratnika.

Grče so prisotne

Velikost prisotnih grč [cm]

Grče niso prisotne

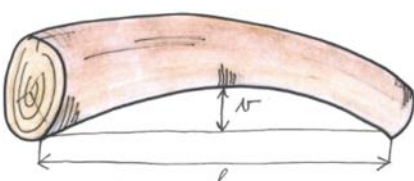
Nazaj
Naprej
Zaključí →

i
×

## Krivost

Krivost predstavlja odklon debla od ravne osi.

Merimo torej višino loka ( $v$ ) na prizadeti dolžini sortimenta in jo primerjamo z dolžino ( $l$ ) sortimenta. Krivost je izražena v cm/m.



## ITHub 1 - 21

Title of innovation	<b>Web-based due diligence and traceability system for forest timber assortments</b>
ITHub	1
FOREST4EU partner (short name)	GIS
Operational Group (short name)	eGOZD

<b>Operational Group (name)</b>	Electronic management of agricultural holdings with emphasis on forestry activity
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	forest owners, researchers, advisors
<b>Link from OGs database</b>	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/elektronsko-poslovanje-kmetijskih-gospodarstev-z.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/elektronsko-poslovanje-kmetijskih-gospodarstev-z.html</a>
<b>Country, region, city</b>	Slovenia
<b>Type of innovation</b>	Service
<b>Keywords</b>	forestry, supply chain, market and consumption; biomass, digital platform, sustainable forest management, wood mobilization
<b>Approach and main results</b>	<p>The international community has developed policy measures to promote sustainable forest management and combat illegal logging and related trade to protect the world's forest resources, mitigate climate change, and safeguard biodiversity. Illegal logging causes damage to forests, affecting climate, biodiversity and the economy. One cause is international trade, driven by the demand of consumer countries. In 2003, the EU adopted the Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan, which is considered the central document and provides various measures to prevent the import of illegal timber. These include the implementation of the European Timber Regulation (EUTR, 2010) and the implementation of the Voluntary Partnership Agreements (VPAs). Since 2013, the EUTR (2010) prohibits placing timber and timber products from illegal sources on the European market. Illegal timber is defined as timber obtained contravening the legislation in force in the country of origin. The EUTR (2010) requires legal entities and private persons, when placing timber or timber products on the European market for the first time, to act with due diligence and related traceability of timber and timber products. According to the Regulation, information must be provided for the last five years on:</p> <ul style="list-style-type: none"> <li>- the type of product,</li> <li>- the species of tree and the quantity of wood,</li> <li>- the felling permit (e.g. decision of the Slovenian Forest Service authorising the felling of the selected trees or other document that is the basis for legal felling),</li> <li>- the name and address of the consignee or trader (personal name and address of the natural person or company and the registered office of the legal entity) to whom the forest timber was supplied or sold, and any other permits, if the logging took place in areas protected under other legislation.</li> </ul> <p>The essence of a 'due diligence system' is that economic operators implement risk management measures to minimise the risk of placing illegally harvested</p>

	<p>timber or timber products containing illegally harvested wood on the market. For example, in the EUTR (2010), a due diligence system has three essential elements: information gathering, risk assessment and risk mitigation. Risk mitigation measures should also be specified if the risk is not negligible. By establishing a due diligence system, manufacturers and traders demonstrate that the products they trade are sourced by the applicable legislation in the country of origin. Traders throughout the supply chain must ensure the traceability of timber and derived products by identifying the operators or traders who have supplied them with wood and derived products and, where applicable, the traders to whom they have provided timber and derived products. They shall keep this information for at least five years and make it available to the competent authorities on request.</p>
<b>Lessons learned</b>	<p>The basis for ensuring a due diligence and traceability system with forest timber products is the possession of a felling licence and a contract with a forestry service provider. At the same time, all other necessary documents can be arranged through the online system. To manage digital records, users must register and log in to the system free of charge. After that, the system guides users through a series of questions which provide needed documents (e.g., a record sheet, an accounting document or a transport declaration). To make it easier to organise digital records, a video guide has also been produced and is available at the following link: <a href="https://www.youtube.com/watch?v=INbgj2kjr7I">https://www.youtube.com/watch?v=INbgj2kjr7I</a>.</p>
<b>Contact information</b>	<a href="mailto:gteinfo@gozdis.si">gteinfo@gozdis.si</a>
<b>Links to website/report/video</b>	<a href="https://www.mojgozdar.si/digitalne-evidence/seznam/">https://www.mojgozdar.si/digitalne-evidence/seznam/</a>
<b>Pictures</b>	

## ITHub 1 - 22

<b>Title of innovation</b>	<b>New methodology for Douglas-fir timber qualification</b>
<b>ITHub</b>	1

<b>FOREST4EU partner (short name)</b>	UNIFI
<b>Operational Group (short name)</b>	Do.Na.To
<b>Operational Group (name)</b>	Douglasiete Naturali Toscana
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest owners, researchers, territorial and public institutions, editorial company, formation company, moral company
<b>Link from OGs database</b>	<a href="https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/douglasiete-naturali-toscane">https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/douglasiete-naturali-toscane</a>
<b>Country, region, city</b>	Italy, Tuscany
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Sustainable Forest Management, wood trasformation, new value chain
<b>Approach and main results</b>	Douglas fir has a medium texture with pronounced heartwood and a yellowish/red colour. Its physico-mechanical properties can vary considerably depending on origin, altitude, silviculture treatments, stand age and growth rate, and the wood characteristics can also be influenced by the different Douglas-fir varieties used in plantations. The aim of the work was to fit into the forest wood supply chain by creating conditions for more profitable use of Douglas fir wood. This can be achieved, for example, by increasing the value of production through more careful wood qualification and diversification of possible uses. The National Research Council's Institute of Bio-Economics based in Florence (Italy) has identified alternative and profitable uses for Douglas fir wood, such as in construction, by defining its technological characteristics and grading methods best suited for its economic and commercial valorisation. The Do.Na.To project tested a rapid method for analysing Douglas fir roundwood in order to classify its timber for structural uses and define the necessary technological characteristics and grading methods. For the study, 158 logs from trees felled in the Vallombrosa forest complex were marked. The characterization was nondestructive and carried out with the Hitman HM200 instrument from the company Fibre-gen. This instrument, designed for qualitative

	<p>assessment of roundwood, measures the speed of a mechanical wave generated by percussion, which propagates longitudinally; higher speeds correspond to higher physical-mechanical quality. During on-site measurements, moisture was also measured with an electric wood hygrometer, as it correlated with speed. Based on the speed values, it was possible to separate better quality logs intended for structural sawing from lower quality logs. The better quality logs were then divided into assortments of various sizes (beams, squares, boards and planks) and then characterized with ViSCAN, a non-destructive tool used for grading timber for structural uses. Since the parameters thus obtained on logs and sawn timber correlated well, the qualification of the roundwood was predictive of the quality of the sawn timber obtained. Finally, to assess the structural quality of the sawn timber, a ViSCAN-portable simulation was performed to grade the strength of each element. Timber qualification from roundwood to sawn timber permits to find the more profitable use for each Douglas-fir log, while the properties of the Douglas fir timber make it suitable for various uses. It can be used for the production of plywood panels, of beams (worked in fours wires, Uso Fiume or Uso Trieste), while sawn timber of lesser thickness is used in carpentry (fixtures, furnishings, beads), for packaging production, and also for the production of glued structural products, such as laminated beams and board panels (CLT - Cross Laminated Timber). Innovation activities consisted of transferring experience gained in instrumental applications aimed at assessing the quality of Douglas-fir roundwood and sawn timber produced from it.</p>
<p><b>Lessons learned</b></p>	<p>The aim of the work was to unite the forest-wood chain and create the conditions for a more profitable use of Douglas fir, as had been learned from exchanges with other European countries. This could be achieved by increasing the value of production through more careful qualification of the wood and diversification of possible destinations. The cost of the equipment is high and therefore only accessible to industries with a high turnover, but the qualification of the wood, from roundwood to sawn timber, can allow a more efficient and therefore more profitable use. In addition to the critical points, the Tuscan wood supply chain also has some strengths that must be exploited in order to succeed in creating a local Douglas fir supply chain that enhances the different assortments. Firstly, the availability of the local wood resource and the territorial "vocation"; secondly, the changing scenarios of the global wood market and the attention given to the issues of carbon footprint reduction in all economic sectors, which have led to a significant upward variation in the prices of roundwood and semi-finished products, making local products economically competitive; then, the research/innovation/transfer</p>

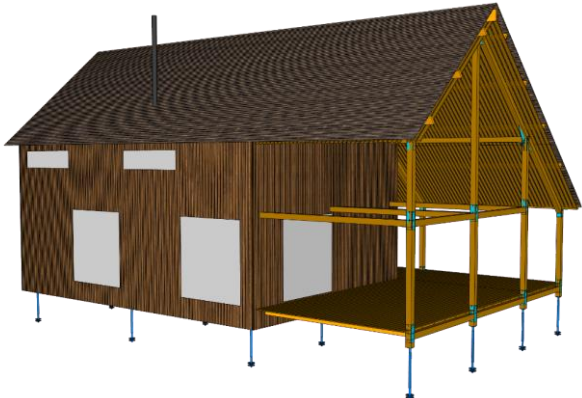
	experience carried out in the region; and finally, the very active local industrial sectors that have focused on Douglas fir to characterise their production and diversify their products.
<b>Contact information</b>	Solaria Anzilotti <a href="mailto:solaria.anzilotti@unifi.it">solaria.anzilotti@unifi.it</a>
<b>Links to website/report/video</b>	<a href="https://www.progettodonato.it/">https://www.progettodonato.it/</a>
<b>Pictures</b>	 <p><i>Figura 1 – Misurazioni strumentali su toppe in piazzale</i></p>

## ITHub 1 - 23

<b>Title of innovation</b>	<b>Prefabricated modular construction system made from Normandy hardwoods</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	CNPF
<b>Operational Group (short name)</b>	BBN
<b>Operational Group (name)</b>	Normandy wood building
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental)</b>	businesses

<b>groups, consumer interests groups or other NGOs)</b>	
<b>Link from OGs database</b>	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/batiment-bois-normandie.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/batiment-bois-normandie.html</a>
<b>Country, region, city</b>	France, Normandie
<b>Type of innovation</b>	Product
<b>Keywords</b>	Construction, Downstream sector, Wood processing
<b>Approach and main results</b>	<p>The Normandy region is renowned for its oak and beech forests, which produce high-quality wood. The hardwood market is therefore large, and companies in the region are involved in the production and processing of this resource. It is used for a wide variety of purposes, including construction, joinery and cabinet-making, cooperage, veneer and panel production, and wood energy. The technical issues are diverse and evolve according to the species and destination selected.</p> <p>For structural timber, oak can be supplied by fresh sawn timber, or air-dried or re-dried. Each of these methods of supply brings with it its own set of constraints (mould and deformation in the case of fresh sawn timber, and a complex supply cycle in the case of re-dried timber). Beech can be used in the form of glued laminated timber, which provides mechanical strength, a standardised appearance and the use of lower quality raw timber. However, beech does not tolerate humidity. Regarding wood used for siding, chestnut has many advantages, but the available volumes are very low and it shows tannin stains. Douglas fir, on the other hand, can be used in larger volumes, but the market is very tight and it is less resistant to punching.</p> <p>Constraints linked to the construction system can also be highlighted. The timber post-and-beam system requires on-site installation, making it tricky to incorporate prefabricated floors, it takes longer to install than timber-framed studs, and it is more complex to install networks. The timber-framed façade system requires fixing systems that ensure perfect watertightness while allowing for expansion gaps with the load-bearing part. Bâtiment Bois de Normandie wants to develop a prefabricated modular construction system based on hardwood from Normandy, enabling the construction of houses, collective housing and public buildings. The target groups for this innovation are social landlords, local authorities and private clients.</p> <p>The main environmental benefit of the project is to be able to supply buildings whose life cycle analysis is better than or equal to current timber-frame construction standards. In particular, this means that the</p>

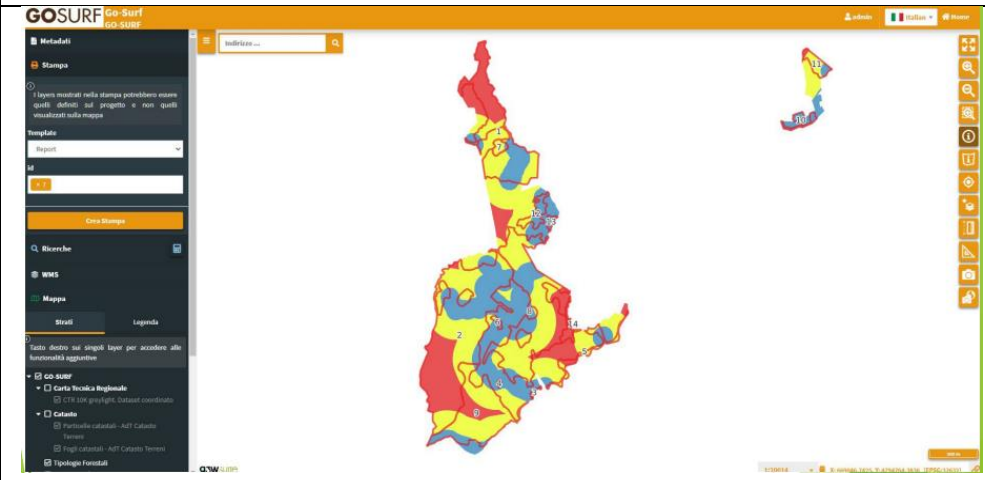
	<p>structure can be easily converted, deconstructed and/or reused. From an economic point of view, the design must be able to minimise costs, and its viability depends in particular on economies of scale. Modular design must therefore be standardised and simplified, via a controlled industrial process in agreement with reliable partners and committed to framework agreements.</p> <p>From a social point of view, the design of the uses, the manufacturing techniques and the destination of the buildings are intended to be as inclusive as possible, in particular through the use of common spaces, the comfort of use of the buildings, the use of local staff for its manufacture as well as a training component and an increase in the skills of the staff during installation and maintenance. A number of private partners have already committed to the project: Bellême Bois (timber supply and sawing), RBD (machining), Artémis (engineering office), Technopieux Normandie (foundations), Leduc Bâtitseur (frame assembly), Manubois (structural timber supply).</p> <p>Institutional partners are also supporting the creation of the prototype. The provision of a location as well as administrative, financial and technical support ensure the success of the project.</p> <p>Discussions with these partners have led to the emergence of a number of solutions and ideas. The choice of wood species and cross-sections was determined. A selection was also made for the thermal envelope system, which is currently being developed.</p>
<p><b>Lessons learned</b></p>	<p>The entire primary structure will be produced by the end of the year 2023, for assembly in the 1st quarter of 2024. Work is scheduled for completion in March 2024. Ultimately, the building will be used as a demonstrator and will be open to a wide range of visitors, from professionals in the timber industry to social landlords, elected representatives and architects. Once the prototypes have been tested and marketed, this project will make it possible to add value to local wood that is currently poorly exploited and/or exported. We will therefore avoid importing softwood and exporting unprocessed French wood. The volumes produced will make it possible to develop the local industry through to secondary processing and thus create long-term jobs in the sector, as this is a long-term project. Skills upgrading should accompany this recruitment drive. The estimated economic impact on the oak market is €2.5 million, on the beech market €1.2 million and on the chestnut market €1.8 million, excluding tax, for the Normandy region. It could lead to the creation of 20 to 25 direct jobs and 10 to 15 indirect jobs (transport, maintenance, administration, etc.).</p>

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<b>Links to website/report/video</b>	<a href="https://www.batimentboisdenormandie.fr/">https://www.batimentboisdenormandie.fr/</a>
<b>Pictures</b>	 <p>copyright : batimentboisdenormandie</p>

## ITHub 1 - 24

<b>Title of innovation</b>	<b>Map accessibility of forest parcel to support wood mobilization</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	UNIFI
<b>Operational Group (short name)</b>	GO-SURF
<b>Operational Group (name)</b>	DECISION SUPPORT TO SUSTAINABLE FOREST PLANNING
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest owners, forest company,
<b>Link from OGs database</b>	<a href="https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/supporto-decisionale-alla-pianificazione-forestale">https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/supporto-decisionale-alla-pianificazione-forestale</a>

<b>Country, region, city</b>	Italy
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Forestry, Remote Sensing data, digital platform, Decisional Support System, wood mobilization
<b>Approach and main results</b>	<p>Forest roads and associated structures are essential for various forestry activities, including harvesting, and have a broader role in supporting agro-silvopastoral operations. Specifically, planning, construction, adaptation, and maintenance of these infrastructures are integral to forest management activities.</p> <p>Forest roads, which encompass both roads and tracks, play a crucial role in facilitating activities aimed at preserving, managing, and enhancing forests and the environment as a whole. Their primary functions include:</p> <ul style="list-style-type: none"> <li>-Facilitating surveillance and monitoring activities.</li> <li>-Ensuring safe forest management practices.</li> <li>-Supporting the construction and maintenance of hydraulic-forestry and hydrogeological defense structures.</li> <li>-Enhancing the enjoyment of ecosystem services associated with recreational and tourism activities in forested areas.</li> <li>-Aiding in wildfire prevention and suppression efforts.</li> <li>-Contributing to civil protection initiatives.</li> <li>-Enabling rescue operations and emergency medical responses in forested regions.</li> </ul> <p>-Additionally, they serve as vital connectors to the management of agricultural and pastoral production units situated within or adjacent to forested areas.</p> <p>From a productivity perspective related to timber harvesting, careful forest road planning is crucial for reducing the overall cost of forest operations. Therefore, it is important to evaluate the condition of forest roads and calculate the accessibility of each forest parcel. In the context of the GO-SURF project, an algorithm has been developed to link the forest road network, slope data, and distance from the roads to create maps assessing the accessibility of each forest parcel. These maps were produced for the forest of companies that are involved in the GO and they are invaluable for understanding and planning future forest road features and evaluating the potential wood resources available for harvesting.</p>

<b>Lessons learned</b>	Mapping accessibility with the algorithm developed within the project is not a complex task. However, very often, the roads identified in the initial cartographic survey of the properties were not actually well-maintained. Therefore, before they can be used for accessibility mapping, it is necessary to undertake maintenance on these roads. So we suggest that before mapping accessibility using road maps, a field survey should be conducted to assess their maintenance status.
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<b>Links to website/report/video</b>	Video: <a href="https://youtu.be/tlyNjOTKPHY">https://youtu.be/tlyNjOTKPHY</a> Website: <a href="https://www.go-surf.it/">https://www.go-surf.it/</a>
<b>Pictures</b>	

## ITHub 1 - 25

<b>Title of innovation</b>	<b>Growing Stock Volume mapping using Remote Sensing Data</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	UNIFI
<b>Operational Group (short name)</b>	GO FORTRACK
<b>Operational Group (name)</b>	DECISIONAL SUPPORT SYSTEM TO MAP FOREST RESOURCES
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental)</b>	Forest owners, forest company, NGOs, research institutions, advisor

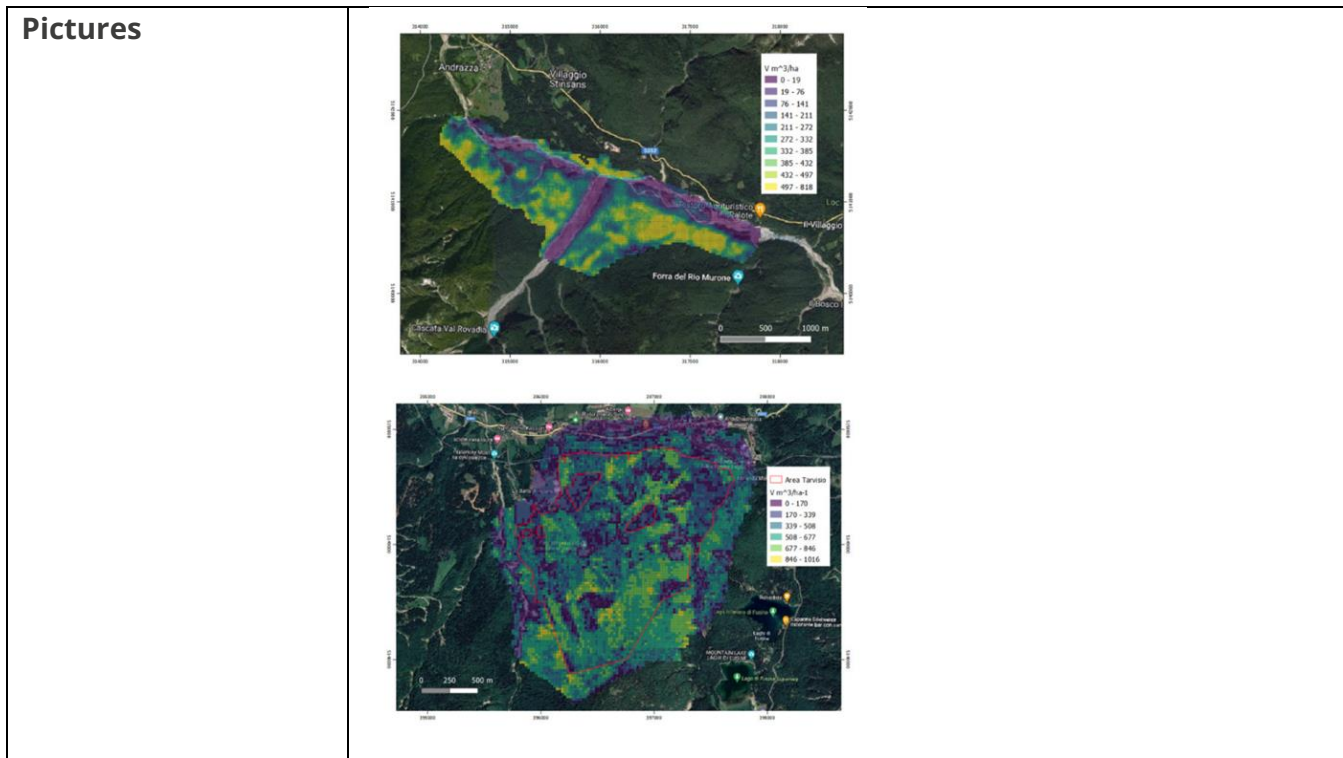
<b>groups, consumer interests groups or other NGOs)</b>	
<b>Link from OGs database</b>	<a href="https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/sviluppo-di-un-sistema-di-supperto-decisionale-la">https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/sviluppo-di-un-sistema-di-supperto-decisionale-la</a>
<b>Country, region, city</b>	Italy
<b>Type of innovation</b>	Process
<b>Keywords</b>	Forestry, Remote Sensing data, digital platform, Decisional Support System, wood mobilization
<b>Approach and main results</b>	<p>The objective of the GO-FORTRACK project is to develop and test a structured modular decision support system that simplifies the implementation of Precision Forestry practices. This system will enable the transfer of research-based procedures to companies in the forestry sector, including technologies like Geographic Information Systems (GIS) and multi-scale remote sensing, forest spatial modeling, and computer algorithms integrated into decision support systems. Within this context, partner companies of the project have emphasized the need to map the volume of growing stock present in the forests throughout their entire company area, which amounts to approximately 1000 hectares per company. This mapping is essential to identify the variability within each individual forest parcel. To accomplish this, an area-based approach was employed, linking field plot data acquired in the context of forest management plans with freely available remote sensing data, such as Sentinel-2 multi-temporal products and GEDI Lidar. As a result, a map of growing stock volume within the area of interest was generated and integrated into the GIS Decision Support System. This map can be utilized for future forest management planning activities.</p>
<b>Lessons learned</b>	<p>The data used to map the growing stock volume were already pre-existing within the companies, as they were acquired for forest management plans as required by the regional law of Calabria. However, it would have been preferable to use a sampling plan that also considered the variability of remotely sensed variables to achieve more accurate maps. Nevertheless, the system that exclusively relies on freely available data enables the mapping of woody volume and the analysis of variability within a forest parcel.</p>
<b>Contact information</b>	Francesca Giannetti <a href="mailto:francesca.giannetti@unifi.it">francesca.giannetti@unifi.it</a>
<b>Links to website/report/video</b>	

<b>Pictures</b>	
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## ITHub 1 - 26

<b>Title of innovation</b>	<b>UAV to map growing stock volume for sharing forest management plan</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	UNIFI
<b>Operational Group (short name)</b>	PRI.FOR.MAN
<b>Operational Group (name)</b>	Shared PRivate FORest MANagement in Eastern Alps
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest companies, advisors, research institutions
<b>Link from OGs database</b>	<a href="https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali">https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/gestione-condivisa-delle-proprieta-forestali</a>
<b>Country, region, city</b>	Italy, Friuli Venezia Giulia
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Forestry, Remote Sensing data, digital platform, Decisional Support System, wood mobilization, new value chain, Sustainable Forest Managment

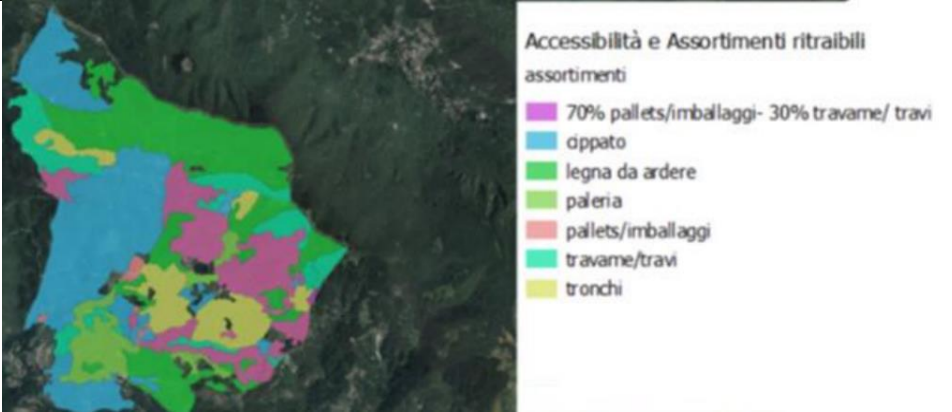
<p><b>Approach and main results</b></p>	<p>The PRI.FOR.MAN project aimed to develop a decision support system that also promoted shared management approaches among multiple landowners. To achieve this, the project initially mapped forest resources across the entire region using data from the national forest inventory and LiDAR data to identify the most promising areas. Once these areas were identified, the project simulated the development of shared forest management plans to demonstrate their feasibility.</p> <p>To accomplish this, four test areas were selected, each involving different landowners. In these areas, 15 ground plots were measured through field sampling, and the area was surveyed using a fixed-wing photogrammetric drone to create a hybrid canopy digital model (photogrammetric DSM - LiDAR DTM). These data were then used to map woody volume, basal area, and dominant height in the area with greater accuracy.</p> <p>The growing stock volume map were subsequently utilized to calculate the value of each landowner's forests within each forest parcel in a shared forest management plan. Under a technical point of view the drone allow to collect very high spatial resolution data within a very short time (approximately 250 ha in 1h30minutes).</p>
<p><b>Lessons learned</b></p>	<p>The fixed-wing drone data with vertical take-off used in the project enabled the collection of information over vast areas in a very short time. However, the cost of the drone is quite high and can only be feasible for purchase in the Friulian context where it was tested if multiple organizations and technicians come together to share the costs. The flight itself is straightforward because it's entirely automated.</p> <p>Fieldwork for collecting data on at least sample areas is always necessary and remains somewhat costly. However, when compared to forest management plans developed using traditional methods, the number of sample areas required is significantly reduced. Nonetheless, costs can be reduced when multiple landowners decide to pool resources compared to conducting surveys independently.</p>
<p><b>Contact information</b></p>	<p>Francesca Giannetti (<a href="mailto:francesca.giannetti@unifi.it">francesca.giannetti@unifi.it</a>)</p>
<p><b>Links to website/report/video</b></p>	



## ITHub 1 - 27

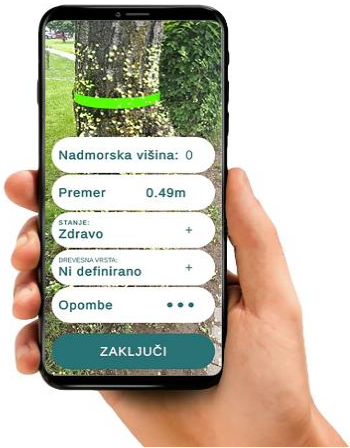
<b>Title of innovation</b>	<b>Mapping forest assortment at parcel level to support wood mobilization</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	UNIFI
<b>Operational Group (short name)</b>	GO-SURF
<b>Operational Group (name)</b>	DECISION SUPPORT TO SUSTAINABLE FOREST PLANNING
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest owners, forest company, NGOs, research institutions, advisor
<b>Link from OGs database</b>	<a href="https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/supporto-decisionale-alla-pianificazione-forestale">https://www.innovarurale.it/it/pei-agri/gruppi-operativi/bancadati-go-pei/supporto-decisionale-alla-pianificazione-forestale</a>

<b>Country, region, city</b>	Italy, Tuscany
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Forestry, Remote Sensing data, digital platform, Decisional Support System, wood mobilization
<b>Approach and main results</b>	<p>Efficiently categorizing wood assortments is a critical task for gaining a more precise understanding of the genuine value of wood, whether it's within a forest or stored in a yard. Additionally, it's essential to measure and classify wood assortments at the parcel level before harvesting to obtain accurate insights into the forest's overall value. Within the GO-SURF system, various maps, such as the Growing Stock Volume Map and Forest Types Map developed using decision trees, enable the creation of a map that identifies potential wood assortments. This map employs the regional mean value to extract this valuable information. At the forest parcel level, the map provides the percentage of growing stock volume for each potential wood assortment, such as pellets, wood chips, firewood, poles, and beams. This map is a valuable tool for forest managers in assessing the economic value of the forest prior to its sale. Furthermore, it is integrated into the Decision Support System within the GO-SURF framework, making it accessible through a simple polygon design in the user interface.</p>
<b>Lessons learned</b>	<p>The map of wood assortments provides information of wood assortments at parcel level and from the point of view of forest managers working within the project appears to be a support instrument to quantify the possible value of the forest. However, in our study area there are many forests managed as coppices so the main forest assortments that were observed in our map were mainly firewood and chips.</p>
<b>Contact information</b>	francesca giannetti <a href="mailto:francesca.giannetti@unifi.it">francesca.giannetti@unifi.it</a>
<b>Links to website/report/video</b>	

<p><b>Pictures</b></p>	 <p>Accessibilità e Assortimenti ritraibili assortimenti</p> <ul style="list-style-type: none"> <li>70% pallets/impallaggi- 30% travame/ travi</li> <li>cippato</li> <li>legna da ardere</li> <li>paleria</li> <li>pallets/impallaggi</li> <li>travame/travi</li> <li>tronchi</li> </ul>
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## ITHub 1 - 28

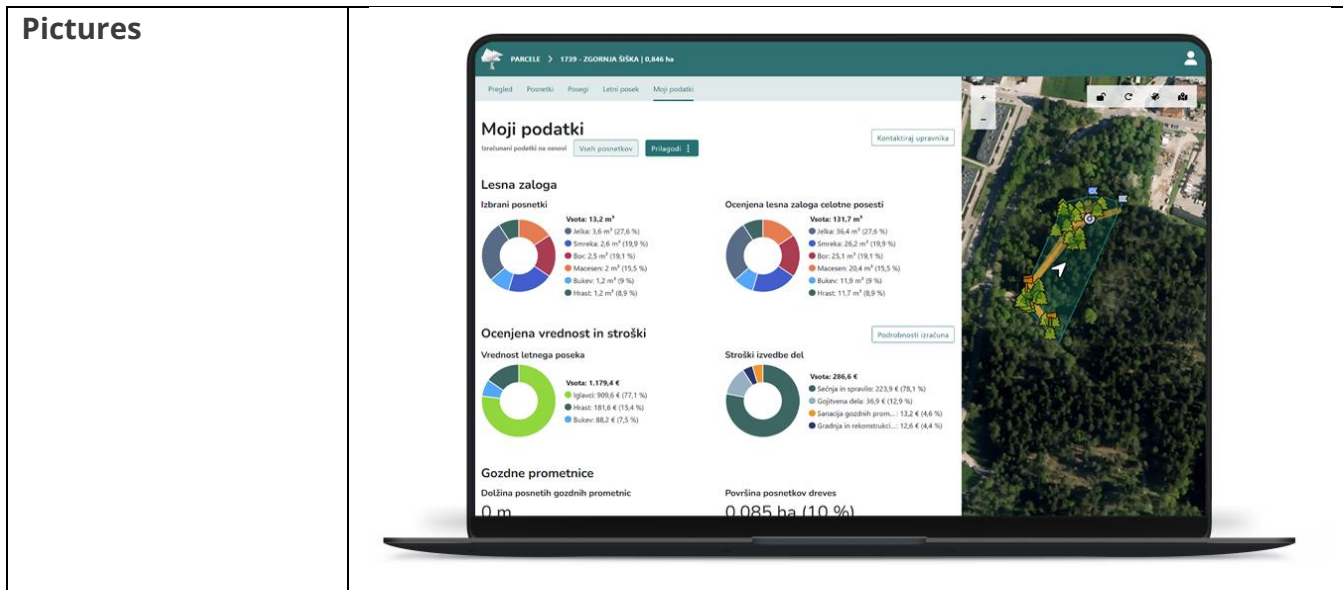
<b>Title of innovation</b>	<b>Di-Gozd Digital Forest Inventory - Mobile app</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	GIS
<b>Operational Group (short name)</b>	Di-Gozd
<b>Operational Group (name)</b>	Digital Forest Inventory - Mobile app
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	forest owners
<b>Link from OGs database</b>	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/di-gozd-digitalna-inventarizacija-gozda.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/di-gozd-digitalna-inventarizacija-gozda.html</a>
<b>Country, region, city</b>	Slovenia
<b>Type of innovation</b>	Service
<b>Keywords</b>	Biodiversity and nature management, supply chain, marketing and consumption, farming

<b>Approach and main results</b>	The mobile application complements the web application. After registering the plot in the online application, you can make five different records. Tree count recording can be done in two ways, automatically or manually, using augmented reality technology. It is used to estimate the wood supply or to determine the amount and value of the wood mass. A recording of the felling path can be used to search for felled trees later or to control the felling.
<b>Lessons learned</b>	The mobile application complements the web application. After registering the plot in the online application, five different surveys can be taken. Tree counting can be done in two ways, automatically or manually, using augmented reality technology. It is used to estimate the wood supply or to determine the amount and value of the wood mass. A recording of the felling path can be used to later search for felled trees or to control felling. Mobile applications, classified as augmenting artificial intelligence system, are also contributing to digitalization and have been developed for forestry or related sectors.
<b>Contact information</b>	<a href="mailto:info@kocevski-les.si">info@kocevski-les.si</a>
<b>Links to website/report/video</b>	<a href="#">Di-goZd</a>
<b>Pictures</b>	

## ITHub 1 - 29

<b>Title of innovation</b>	<b>Di-GoZd Digital Forest Inventory - Internet app</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	GIS

<b>Operational Group (short name)</b>	Di-Gozd
<b>Operational Group (name)</b>	Digital Forest Inventory - Mobile app
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	forest owners
<b>Link from OGs database</b>	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/di-gozd-digitalna-inventarizacija-gozda.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/di-gozd-digitalna-inventarizacija-gozda.html</a>
<b>Country, region, city</b>	Slovenia
<b>Type of innovation</b>	Service
<b>Keywords</b>	Biodiversity and nature management, supply chain, marketing and consumption, farming
<b>Approach and main results</b>	The online application allows users to review their own forest land based on existing public data and estimate the value of their own forest's annual yield. Users can also assess the condition, value, and control measures of the forest based on their own images created with the mobile application. The application provides users with analysis tools for reviewing the images created, a method for calculating the value of trees, and a system for monitoring events on the forest plot
<b>Lessons learned</b>	From the online application, we can get an overview of our own plots using publicly available data. It provides us with control over the interventions carried out and an overview of the records created. It allows us to make a more accurate assessment of the condition of the forest plot. It gives us information about our planned harvest and value.
<b>Contact information</b>	<a href="mailto:info@kocevski-les.si">info@kocevski-les.si</a>
<b>Links to website/report/video</b>	<a href="#">Di-gozd</a>



## ITHub 1 - 30

<b>Title of innovation</b>	<b>Social network of sustainable forest use for the production of biomass for thermal purposes</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	BOSCAT
<b>Operational Group (short name)</b>	Calor Rural
<b>Operational Group (name)</b>	Social network of sustainable forest use for the production of biomass for thermal purposes
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest Owners, Advisors, consumer interests groups, NGOs,
<b>Link from OGs database</b>	
<b>Country, region, city</b>	Spain; Aragon, Navarra, Catalunya
<b>Type of innovation</b>	Social innovation


<b>Keywords</b>	biomass, circular bioeconomy, Cooperation, Innovation social systems, organisational innovation, Sustainable Forest Management, wood mobilization and transformation
<b>Approach and main results</b>	<p>The lack of demand in the rural area of forest biomass for thermal purposes is a brake on the implementation of viable models of collective management of this resource. On the other hand, there are masses of trees with little commercial interest, currently unused, which increase the risk of fires and forest pests. It is necessary, therefore, to plan a collective management of forest masses and endogenous use of the resource that contributes to the circular economy that the rural environment requires, contributes to the creation of employment and resources, reduces GHG emissions to the atmosphere and minimizes Fire risks and forest pests. It is essential that both administrations and the general public perceive the economic, social and environmental benefits of sustainable collective management of forest biomass.</p> <p>Creation of a social network for the use of forest biomass for thermal purposes, generating employment and resources, improving its management, contributing to the energy transition and reducing GHG emissions. Implement biomass exploitation networks based on the ownership of the masses, their management, optimizing collective production processes, and setting the business model. Design and implement the model of intervention in masses and forest remains of low commercial interest that minimize the risk of fires and proliferation of forest pests. Promote the use of biomass, in public buildings and local populations, and disseminate the resource as a source of renewable energy, reinforcing the role of the rural environment in the energy transition.</p>
<b>Lessons learned</b>	<p><b>The sustainable and viable use of forest biomass presents environmental, economic and social advantages in the territories.</b></p> <p><b>Environmental</b> - Contribution to the 5C focal area and objectives 1 and 3 of EPI-AGRI: - Reduces the risk of forest fires due to the management of trees, eliminating excess fuel in the forest; - Reduce the emission of CO2 into the atmosphere by replacing fossil fuel emissions; - It improves the stability of the forest masses through the application of viable intermediate silvicultural treatments; - 100% renewable energy.</p> <p><b>Economic</b> - Contribution to the 5C focal area and objectives 1 and 3 of EPI-AGRI: - Competitive discounts compared to other sources of energy (diesel, natural gas, etc.); - Encourages local economic activity; - Decreased external energy dependence, which favors the trade balance.</p> <p><b>Social</b> - Contribution to the 5C focal area and to EPIAGRI objective 3: - New jobs for the creation of jobs in the rural environment (In the</p>

	<p>mountains with the creation of forestry teams, equipment, transport, logistics and distribution and in points of consumption (machinery, installations, maintenance, boiler changes).</p> <p><b>Contribution to the circular economy</b> - On the other hand, the proposed use, based on collective and grouped interests, as well as the use of the resource, fundamentally endogenous, enhances the circular economy by using this resource, closing the cycle of its life cycle. The creation of jobs in the rural area also contributes to generate economy in the territory where the resource is located.</p> <p><b>Young people and women</b> - The depopulation of rural areas is taking place, fundamentally, due to the lack of job opportunities for young people and women of the territory. The creation of new employment opportunities and new opportunities for entrepreneurship generated by the project will provide a better viability to the whole of the territories.</p>
<b>Contact information</b>	<a href="mailto:joachim@boscat.cat">joachim@boscat.cat</a>
<b>Links to website/report/video</b>	<a href="https://teder.org/proyectos-finalizados/grupo-operativo-calor-rural/">https://teder.org/proyectos-finalizados/grupo-operativo-calor-rural/</a> , <a href="https://www.youtube.com/watch?v=Ohi5nZyFW6o&amp;t=13s">https://www.youtube.com/watch?v=Ohi5nZyFW6o&amp;t=13s</a>
<b>Pictures</b>	

## ITHub 1 - 31

<b>Title of innovation</b>	<b>Innovation in products, processes and marketing to introduce local woods with special, greater value-added characteristics to the Catalan market</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	BOSCAT
<b>Operational Group (short name)</b>	SINGULARWOOD
<b>Operational Group (name)</b>	Innovation in products, processes and marketing to introduce local woods with special, greater value-added characteristics to the Catalan market
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental)</b>	forest and wood businesses, researcher centers, advisors, forest owner association

<b>groups, consumer interests groups or other NGOs)</b>	
<b>Link from OGs database</b>	
<b>Country, region, city</b>	Spain, Catalunya
<b>Type of innovation</b>	Product
<b>Keywords</b>	Sustainable forest management, circular bioeconomy, carbon stock, virtual platform, wood mobilisation, forest industry, new products,
<b>Approach and main results</b>	<p>The aim of the project is to valorise wood with special dimensions and characteristics in the forests of Catalonia, and in particular, wood produced by the members of the cooperative Forestal de Catalunya, SCCL (Serveis Forestals, SF) and the company Agrupació Forestal del Montnegre i el Corredor SL (AFMC) through innovation in products, the transformation process and the methods/techniques for marketing these types of wood, presenting them to the market in a format that is different from the usual format in Catalonia. The project aims to introduce a new product "as a different concept to the formats of planks in standard dimensions available in large retail outlets," and to offer a product that has been preprocessed as little as possible and dried under ideal conditions to ensure an optimal technological quality and in "boules", using the French model. The idea is to introduce this product to the retail market (wood craftsmen, cabinetmakers, carpenters, decorators, architects, surveyors, etc.), which has been identified as a "market niche". The aim is to improve the economic results of forestry operations and provide the opportunity for forest owners to have a wider range with greater added value when selling their wood, in a market different from the one for which this wood was initially intended, which was packaging and/or bioenergy. Another objective of the project is to improve the competitiveness of the two groups of forest producers (Forestal de Catalunya, SCCL and Agrupació Forestal del Montnegre Corredor), which include forestry producers and groups of forest owners. By applying new processes, they can add value to their products, and focus them on new local markets, with short distribution circuits.</p>
<b>Lessons learned</b>	<p>The end result is the "SingularWood" business initiative, which aims to facilitate marketing and add value to the woods from Catalonia's forests with special and unique features. Each and every one of our products is unique. The virtual platform (<a href="http://www.singularwood.cat">www.singularwood.cat</a>) has been created to offer all the "boules" to the end customers: cabinetmakers,</p>

	<p>carpenters, designers, etc. The same platform contains a description of each product, which includes all the necessary information and which asks the craftsman who will use the "boules" to determine the suitability of each product for the creation of the unique pieces that they have conceived and designed.</p> <p>The execution of this OG led to the launch of an initiative that gives added value to trunks with unique features, and which after going through a minimal pre-treatment process and with a guarantee of traceability, can be made available to craftsmen (cabinetmakers, carpenters, designers, architects, etc.) for use in their unique creations</p>
<b>Contact information</b>	<a href="mailto:cooperativa@forestal.cat">cooperativa@forestal.cat</a>
<b>Links to website/report/video</b>	<a href="#">FUSTES LOCALS - Posem en valor fusta de característiques especials i seva singulars (singularwood.cat)</a>
<b>Pictures</b>	

## ITHub 1 -32

<b>Title of innovation</b>	<b>Development of an efficient logging system using the LOGGFORCAT boom harvester</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	BOSCAT
<b>Operational Group (short name)</b>	LOGGFORCAT
<b>Operational Group (name)</b>	LOGGFORCAT – Development of an efficient logging system using the LOGGFORCAT boom harvester
<b>Type of OG's partners (farmers, forest owners, researchers,</b>	forest businesses, research center

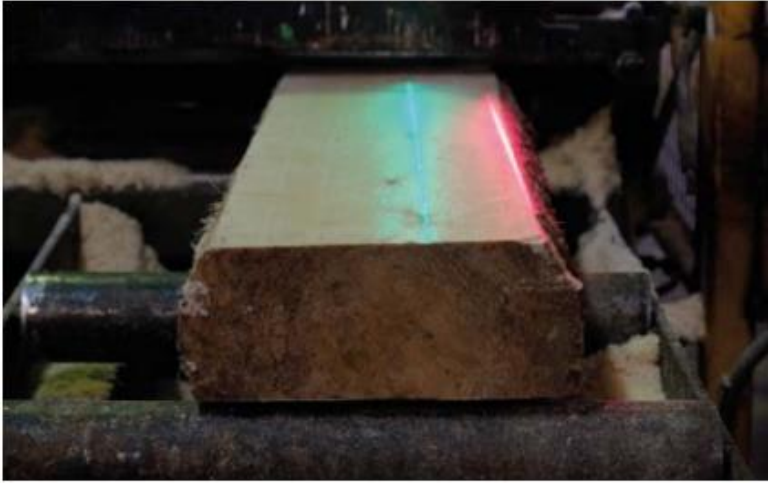
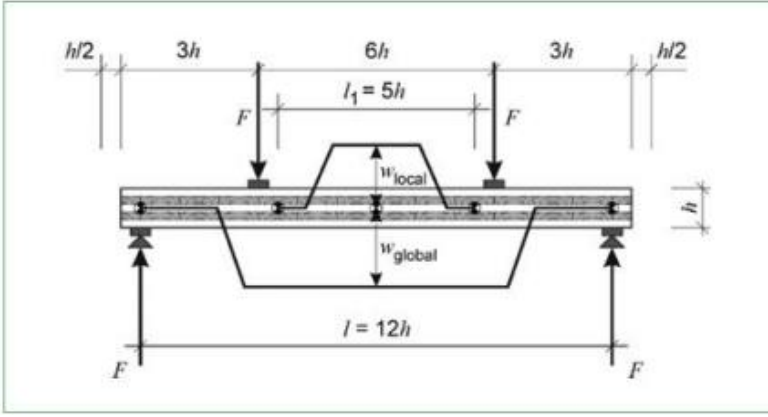
<b>advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	
<b>Link from OGs database</b>	
<b>Country, region, city</b>	Spain, Catalunya
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Wood mobilization, new value chain, forest industry, circular bioeconomy, biomass, technical innovation, Landscape / Territorial management, Supply chain, marketing and consumption
<b>Approach and main results</b>	<p>LOGGFORCAT is an operational project that has created an innovative wood clearing system based on the construction of a prototype 15-meter telescopic arm with a fastener that allows easier track-side clearance of felled trees, stacking them to match forest truck loading requirements, improving yields, reducing environmental impact and improving safety in forestry work.</p> <p>Description of the actions carried out in the project:</p> <ul style="list-style-type: none"> <li>- Design and construction of the LOGGFORCAT RS prototype.</li> <li>- Design and validation of clearing system with the LGGFORCAT RS prototype.</li> <li>- Pilot tests for the validation of the LOGGFORCAT RS prototype and LOGGFORCAT clearing system.</li> <li>- Transfer of results</li> </ul>
<b>Lessons learned</b>	<p>Description of the actions carried out in the project.</p> <p>Design and construction of the LOGGFORCAT RS prototype.</p> <p>Design and validation of clearing system with the LGGFORCAT RS prototype. Pilot tests for the validation of the LOGGFORCAT RS prototype and LOGGFORCAT clearing system.</p> <p>Transfer of results</p> <p>The prototype, LOGGFORCAT RS, has been created, involving a collection arm with clamp, which is approved and bears the CE mark. The prototype allows clearing with a new, more financially and environmentally efficient system</p>
<b>Contact information</b>	<a href="mailto:estratsdebosc@gmail.com">estratsdebosc@gmail.com</a>

<b>Links to website/report/video</b>	Twitter account <a href="#">@loggfor</a>
<b>Pictures</b>	

## ITHub 1 - 33

<b>Title of innovation</b>	<b>Development of a prototype crosslaminated timber panel made from local timber to improve the construction of buildings in terms of sustainability</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	BOSCAT
<b>Operational Group (short name)</b>	not found
<b>Operational Group (name)</b>	Development of a prototype crosslaminated timber panel made from local timber to improve the construction of buildings in terms of sustainability
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	forest industry, research center, association of timber dealers and sawyers of Catalonia
<b>Link from OGs database</b>	
<b>Country, region, city</b>	Spain, Catalunya
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Wood mobilisation, forestry, new product, circular bioeconomy, tecnical innovation, supply chain



<p><b>Approach and main results</b></p>	<p>The project was designed to obtain the information needed to assess whether the manufacture of cross-laminated timber panels (CLT) in Catalonia using local timber is technically and economically feasible. To this end, a prototype panel was manufactured under real industrial production conditions. This allowed us to measure the performance of the processing and preparation of the wood (sanitisation, planing, drying), the quality of the manufactured product and its strength. Based on the technical results together with the economic and market information that has also been obtained, the evidence for and against manufacturing CLT in Catalonia with Catalan wood has been identified. The project analysed CLT manufacturing technologies, design procedures and building construction. Visits were paid to factories, CLT machining centres, adhesive producers and specialised industrial machinery manufacturers in Europe.</p> <p>The objectives addressed in the framework of this project were:</p> <ol style="list-style-type: none"> <li>1. Determine the physical and mechanical properties of the country's wood in order to determine the potential quality of the CLT that can be obtained.</li> <li>2. Ascertain the wood processing yields for CLT production: drying, sawing, planing, optimisation and gluing.</li> <li>3. Manufacture prototype panels with local wood and analyse their properties according to current European standards.</li> <li>4. Analyse the potential market and the feasibility of implementing CLT manufacturing technologies in Catalonia.</li> </ol>
<p><b>Lessons learned</b></p>	<p>The results obtained show that the weaknesses are the cost of raw material, the availability of material and the relatively low yield of local wood. The strengths are the high strength of the material and the increase in demand, which is already apparent and is expected to increase even more in the near future. Therefore, further research is recommended to improve the weaknesses identified, for example through the use of automatic grading systems that identify the best structural timber for each project, or the improvement of the drying processes. From a qualitative point of view, the industrial manufacture of CLT panels in Catalonia is technologically feasible. In terms of the strength characteristics of the material and the gluing processes, there is no reason to rule out the possibility of manufacturing this material with local wood. However, it must be borne in mind that it is necessary to achieve a processing yield comparable to that of other European factories in order to produce competitively priced panels. To achieve this, it is necessary to have enough affordable timber with a reduced</p>

	amount of singularities that comes from forests managed to obtain quality wood.
<b>Contact information</b>	<a href="mailto:grupboix@grupboix.com">grupboix@grupboix.com</a>
<b>Links to website/report/video</b>	<a href="https://www.arescat.cat/es/2018/11/23/arescat-participa-en-lo-proyecto-desarrollo-de-un-panel-prototipo-de-madera-laminada-cruzada-con-madera-local-para-mejorar-la-construccion-de-edificios-en-temas-de-sostenibilidad/">https://www.arescat.cat/es/2018/11/23/arescat-participa-en-lo-proyecto-desarrollo-de-un-panel-prototipo-de-madera-laminada-cruzada-con-madera-local-para-mejorar-la-construccion-de-edificios-en-temas-de-sostenibilidad/</a>
<b>Pictures</b>	 <p>Wood being sawed. Photo: Operational Group</p> 

## ITHub 1 - 34

<b>Title of innovation</b>	<b>Improving the bond between steel and synthetic cable (MUCAS)</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	BOSCAT

<b>Operational Group (short name)</b>	MUCAS
<b>Operational Group (name)</b>	Improving the bond between steel and synthetic cable (MUCAS)
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	research center, forest business
<b>Link from OGs database</b>	
<b>Country, region, city</b>	Spain, Catalunya
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Wood mobilisation, forestry, technical innovation, forest machinery and tools, labor security, sustainable forest management
<b>Approach and main results</b>	<p>The use of synthetic cable among companies involved in timber harvesting and associated services is very low in Catalonia, as a result of the high abrasion suffered by the cable, which reduces its useful life and its high acquisition cost, up to 2 or 3 times higher than steel. The feedback we have from the sector is that this abrasion and subsequent breakage occurs mainly in the last few metres of the synthetic cable, so the hypothesis put forward is that if wear can be reduced only in these last few metres, this would increase its useful life. To make this possible, a synthetic-steel bond is proposed, with the steel located in the last few metres of the cable. In this way the abrasion would be concentrated to a large extent on the steel and not on the synthetic part. The difficulty lies in creating a bond that is effective during timber harvesting work. It must be able to withstand the stresses applied, be adaptable to the machinery used, and be relatively easy to implement.</p> <p>The aim is to enhance synthetic cable by implementing new tools and techniques to improve its use.</p>
<b>Lessons learned</b>	The aim is to promote synthetic cable and its advantages that go beyond both its technical and economic limitations and to obtain positive results that ensure the synthetic-steel connection increases the service life of synthetic cable, further reducing the aforementioned limitations.

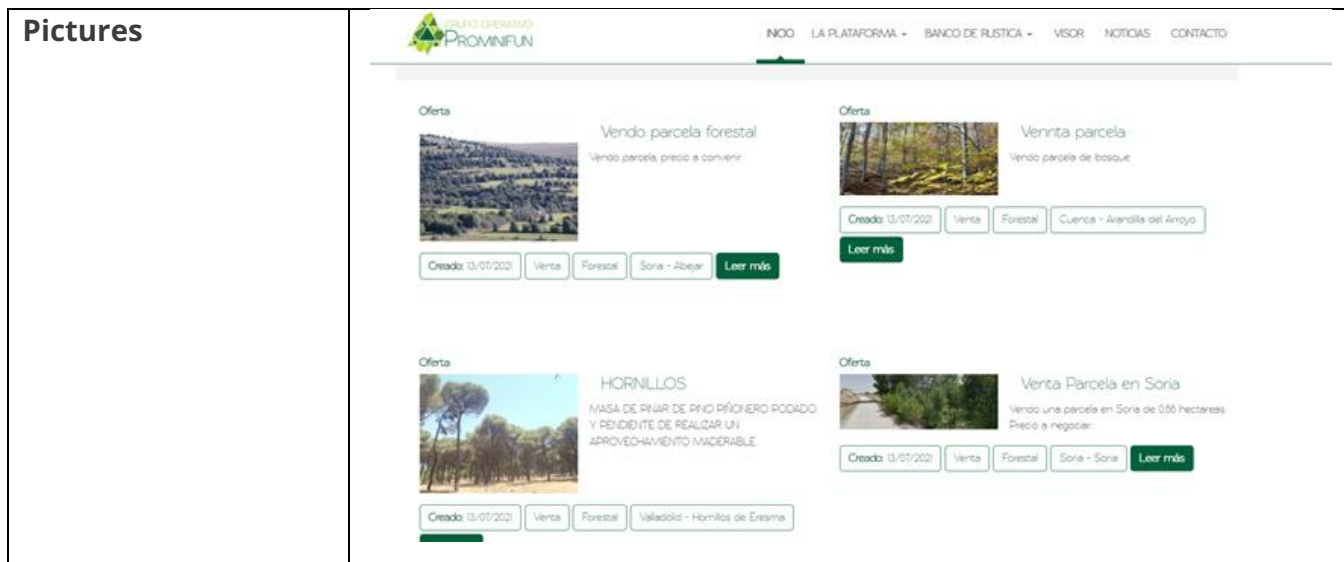
<b>Contact information</b>	<a href="mailto:grupboix@grupboix.com">grupboix@grupboix.com</a>
<b>Links to website/report/video</b>	<a href="https://www.grupboix.com/en/cooperation-for-innovation-improving-the-union-between-steel-wire-rope-and-synthetic-wire-rope-mucas/">https://www.grupboix.com/en/cooperation-for-innovation-improving-the-union-between-steel-wire-rope-and-synthetic-wire-rope-mucas/</a>
<b>Pictures</b>	 

## ITHub 1 - 35

<b>Title of innovation</b>	Rural property management platform
<b>ITHub</b>	2
<b>FOREST4EU partner (short name)</b>	CESEFOR
<b>Operational Group (short name)</b>	GO PROMINIFUND
<b>Operational Group (name)</b>	Innovative management models to improve productivity in smallholder areas
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest owners, reseachers, technological centers,
<b>Link from OGs database</b>	<a href="#">Grupo Operativo GO PROMINIFUN: 'Modelos de gestión innovadores para la mejora de la productividad en áreas de minifundio'   EIP-AGRI (europa.eu)</a>
<b>Country, region, city</b>	Spain, Soria, Zamora y Pontevedra

<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	forestry, business model, Decisional Support System, Multifunctional forest management, digital platform
<b>Approach and main results</b>	<p>The change in population and land use in the Spanish rural forest environment in recent decades has led to the abandonment of large areas with the potential to be put to good use, which requires the design of new management models and proposals for solutions to facilitate access to their productive revaluation. Those areas whose management is limited due to their size and/or the difficulty of knowing their ownership constitute a large number of hectares that can add value to rural areas, for which administrations, owners and other agents involved must work together in the innovative implementation of solutions. The <b>Rustic Property Management Platform is a web tool designed to facilitate the management of rustic plots</b>, both agricultural and forestry, and help their owners to manage their plots, as well as to contact other owners with whom they want to interact either by associating or through the purchase, sale, exchange or lease of plots. Through this platform you will be able to administer the management of your rustic plots, both agricultural and forestry, as well as to get in touch with other owners with whom you want to interact either by joining or by buying, selling, exchanging or leasing plots. The tool allows: (1) Carry out an inventory, stock and profitability analysis of an owner's rustic holdings through tabular and geographical consultation tools in a map viewer. (2) Promote the exchange or swapping of properties that favors their grouped management. Register plots of land in a rural holdings registration service. (3) Access a service for the generation of agreements for the transfer, custody, rental or lease of rural real estate between owners or managers. (4) Access information on fire risk and territorial zoning (regional, municipal or other) that may affect forestry treatments, exploitation and/or post-fire restoration, as well as funding through subsidies or aid in relation to this zoning. (5) Obtain information about forest fire damage coverage. (6) Obtain information on the times of danger with a view to regulating uses and requesting permits.</p> <p>Specifically, the user would be able to: (1)- Access cadastral rustic plots of land throughout Spain to: o Register the plots of your property. o Create holdings by grouping your plots to manage them more easily. o Create groupings of owners to manage your plots together. (2)- Access the Plot Announcement Service: o Where you can create advertisements to buy, sell, lease or exchange plots of land. o You can also create announcements to form groups of owners. o Access the ads of other registered owners and get in touch with them to make transactions. (3)-</p>

	<p>Access the geographic viewer with information about your plot:</p> <ul style="list-style-type: none"> <li>o Current vegetation.</li> <li>o Suitability of your plot for other vegetation</li> <li>o Potential assessment of the profitability of your plot</li> <li>o Fire risk</li> <li>o Regulations</li> <li>o Protected areas</li> </ul>
<p><b>Lessons learned</b></p>	<p>The atomisation of land ownership and the need for a tool to facilitate the management of these plots makes it necessary to develop a digital tool to help facilitate this management. The smallholding management platform proposes a range of innovative solutions, such as having prior information on the characteristics of the plots in terms of their dendrometric possibilities and productive potential. The platform incorporates the possibility of grouping plots from different owners and being able to be managed as a group of producers or owners. However, in order to be used, it is necessary to add forestry references and to be able to document forestry operations under forest planning instruments. Therefore, there is a need to develop the appropriate software for the tool, enabling the management of these plots according to the technical management plans or associated forestry references. It is also necessary to extend the tool, making it possible to have all the spatial information of the management plans available. In the agricultural field, the tool needs to develop a digital version of the field notebook as an additional utility. Finally, a mobile application with offline functionality is necessary to complete its implementation.</p>
<p><b>Contact information</b></p>	<p><a href="mailto:roberto.rubio@cesefer.com">roberto.rubio@cesefer.com</a></p>
<p><b>Links to website/report/video</b></p>	<p><a href="https://gestion.minifundio.es/">https://gestion.minifundio.es/</a></p>



## ITHub 1 - 36

<b>Title of innovation</b>	<b>Methodology for assessing the economic-financial sustainability of forest holdings</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	CESEFOR
<b>Operational Group (short name)</b>	GO PROMINIFUND
<b>Operational Group (name)</b>	Innovative management models to improve productivity in smallholder areas
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Forest owners, reseachers, technological centers,
<b>Link from OGs database</b>	<a href="#">Grupo Operativo GO PROMINIFUND: 'Modelos de gestión innovadores para la mejora de la productividad en áreas de minifundio'   EIP-AGRI (europa.eu)</a>
<b>Country, region, city</b>	Spain, Soria, Zamora y Pontevedra
<b>Type of innovation</b>	Service

<b>Keywords</b>	forestry, business model, Decisional Support System, Multifunctional forest management
<b>Approach and main results</b>	<p>Historically, the Spanish forestry sector presents a deficit in the economic study of forestry operations in terms of the analysis of either the capitalization of the income obtained by the forest owner or the income derived from the extraction of the different types of products in the different types of forestry operations. A calculation methodology is proposed to evaluate the economic-financial sustainability of the most relevant forestry exploitations in Spain, incorporating the analysis from the perspective of the forester-producer and/or the investor, by calculating the profitability, the Internal Rate of Return (IRR) and the Net Present Value (NPV). The profitability analysis is based on the annual income per reference Agricultural Work Unit in the Spanish agricultural sector, established at 30,622.23 for 2021. The analysis from this new perspective makes it possible to evaluate the profitability of the forest, compare it with those of other forestry systems that could occupy the same areas and establish a minimum area for each forest with which to obtain a "forestry" income equivalent to the agricultural income. The assessment of the economic-financial sustainability of forest holdings has usually been analysed from the point of view of the investor, so that the periodic forest income obtained, which could share many aspects and be assimilated to a certain extent to agricultural income, has generally not been taken into account. The purpose of this methodology is to evaluate the economic and financial sustainability of the most relevant forestry operations in Spain, both from a business perspective -with a broader approach from the point of view of a private investor- and for the owner/forester. The methodology proposed in this work incorporates the perspective of the annual income for the owner/forester into the more usual analysis of profitability, by calculating the IRR and NPV. The <b>key aspects</b> for the evaluation of the economic-financial sustainability of the forest holdings analyzed were: Market situation, Variability of timber prices and rotation cycle optimisation. control of expenditure, forest activity diversification, determination of IRR and NPV and economic evaluation comparable to agricultural crops. The <b>forestry systems analyzed</b> where: 5 <i>Pinus sp.</i> systems (for wood, pine cones and resin production), 5 <i>Quercus sp</i> systems (for wood, cork and dehesa systems), chestnut (for wood and fruit), poplar, eucalyptus and beech for wood use and finally, scrub and grassland. Regarding the choice of <b>silvicultural models</b>, the most representative models existing in Spain have been identified, trying to establish for each of them a standard model that encompasses all possible scenarios and that can at least be applied in the greatest number of possible situations. For the calculation of the <b>annual costs</b> of each silvicultural treatment,</p>

	<p>many variables were taken into account: whether or not the land can be mechanized, whether or not it is steep or stony, the average productivity according to the quality of the season, etc. Average operating costs and acceptable quality and health status have been taken into account. For the <b>calculation of income</b>, three season qualities are established: OPTIMAL, ADEQUATE and MARGINAL, based on three productions (high, medium or low). The <b>prices</b> are constant for all models and have been set with different references such as (1) prices from the study on the profitability of different Spanish forest species carried out by the Polytechnic University of Madrid for the Ministry of Ecological Transition and Demographic Challenge (Ortuño, 2018). Data from the Observatorio de Precios de la Madera de la Confederación de Organizaciones de Selvicultores de España (COSE, 2015). The prices used by the technicians of the Forestry Associations of Castilla y León. For the standardization of methodology and results the application of the designed methodology has been standardized by creating an Excel file per silvicultural model with a standardized structure distributed in five tabs: <b>starting assumptions, expected income, expected costs, analysis tables and results</b>. In this file, starting conditions must be established and a list of costs and revenues that will occur in the different years of the production cycle must be entered. All the information is used in the analysis tab to establish the corresponding silvicultural itinerary in which both, the costs to be assumed and the income to be obtained, are detailed, specifying the year in which each of them occurs. From this itinerary and automatically, the corresponding analysis table is fed, used to generate all the calculations presented in the results tab. The final results generated are grouped under four headings: (a) NPV and IRR of the logging operation for the discount rate set in the baseline assumptions (also for 4, 6 and 8 %). (b) Determination of the annual equivalent income and minimum harvest size. (c) Valuation of the profitability of the logging operation without considering financing: costs, income and final balance, referred to in €/ha and €/(ha/year), referred to € year 0, € end-of-shift and € end-of-shift applying the CPI. (d) Same values as in the previous section, but considering financing.</p>
<p><b>Lessons learned</b></p>	<p>With the data from the analysis in the current economic framework, it can be concluded, for economic calculation purposes, the similarity of forestry and agricultural holdings, as well as the need to use profitability calculation systems already identified in the agricultural activity. Of particular importance is the exhaustive control of costs, which is considered an essential issue for the viability of the forest exploitation. It is recommended to continue developing the methodology with analyses based on different silvicultural models and to incorporate environmental benefits not</p>

	contemplated in this study, such as income from carbon sequestration, which could make plantations profitable that apparently are not. A future development of the market for greenhouse gas emission allowances, in which direct compensation to landowners for carbon sequestration is established, may generate new economic benefits from net carbon sequestration in forest biomass and wood products. Internalizing carbon or other ecosystem benefits in land-use change decisions can clearly favour the expansion of some species in areas where valuing the net benefits of the commercial goods and services associated with their exploitation alone does not favour this investment.
<b>Contact information</b>	<a href="mailto:roberto.rubio@cesefer.com">roberto.rubio@cesefer.com</a>
<b>Links to website/report/video</b>	<a href="https://www.minifundio.es/sites/default/files/editor/2_rentabilidad_ok.pdf">https://www.minifundio.es/sites/default/files/editor/2_rentabilidad_ok.pdf</a>
<b>Pictures</b>	

## ITHub 1 - 37

<b>Title of innovation</b>	<b>Logging trailer - solution for efficient use of transportation resources of farmers out of agricultural season</b>
<b>ITHub</b>	1
<b>FOREST4EU partner (short name)</b>	LLA
<b>Operational Group (short name)</b>	IR_MP3
<b>Operational Group (name)</b>	Innovative solutions in efficient use of agricultural resources in transportation of logs outside agricultural season.
<b>Type of OG's partners (farmers, forest owners, researchers, advisors, businesses, environmental groups, consumer interests groups or other NGOs)</b>	Seven (7) private agricultural, forestry and transport companies agricultural and forestry sector, one researcher (Riga Technical university), two NGOs (Latvian Logistics association and Latvian Association of Agricultural Cooperatives)
<b>Link from OGs database</b>	<a href="https://ec.europa.eu/eip/agriculture/en/find-connect/projects/inovat%C4%ABvi-risin%C4%81jumi-lauksaimniec%C4%ABbas-un.html">https://ec.europa.eu/eip/agriculture/en/find-connect/projects/inovat%C4%ABvi-risin%C4%81jumi-lauksaimniec%C4%ABbas-un.html</a>

<b>Country, region, city</b>	Latvia
<b>Type of innovation</b>	Technological innovation
<b>Keywords</b>	Wood mobilization, Cooperation, Agricultural production system, Farming equipment and machinery, Smart-application, Adaptation to climate change
<b>Approach and main results</b>	<p>OG has developed a version of a long logging trailer that is convenient in use also for transportation of short logs thanks to specific construction of bunks that can be moved closer to lifting crane and away from that when cradles are filled. Another aspect of this innovation is utilising idle truck resources of agriculture businesses during their off-season and engaging in transportation of logs where in winter period there is shortage of transportation capacity.</p> <p>Transportation of timber from forest to production has large seasonal fluctuations. In Latvia logistics experience about 50% of transportation capacity shortage in winter while there is close to 50% surplus of transport in summer. This technical innovation provides opportunity to involve idle cargo trucks from agriculture sector where there are lots of trucks that are equipped with dump trailers and dedicated for transporting grain in autumn. Rest of the season they are partly idle, partly used for transportation of mineral materials for road construction in summer if there is any construction in the neighbourhood. Logging trailer can be attached to same truck instead of dump trailer and thus truck can be efficiently used also in winter.</p> <p>Business models could be various. One option is that forestry company owns the logging trailer and rents it out when there is shortage of transportation means.</p>
<b>Lessons learned</b>	<p>Question that may arise: why has above described innovation not spread and popular widely already now?</p> <p>This mostly is due to shortage of money. Farmers cannot afford to invest in another asset that will be used 1/2 of the year only. Options of owning them by forestry businesses or renting businesses seems to be alternatives.</p>
<b>Contact information</b>	Guntars Reinfelds, Board chairman, SIA "SELF Loģistika", e-mail: <a href="mailto:guntars.reinfelds@selflogistic.lv">guntars.reinfelds@selflogistic.lv</a> ; Normunds Kruminis, Board Chairman , LLA, e-mail: <a href="mailto:n.krumins@gmail.com">n.krumins@gmail.com</a>
<b>Links to website/report/video</b>	


<b>Pictures</b>	
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