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Alpine Space

Forest EcoValue

REGIONAL ROADMAPS

REGIONAL ROADMAPS O.2.4

O.2.4

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VERSION 1

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Alpine Space

Forest EcoValue

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SO 2.2: Promoting the transition to a circular and resource efficient economy

Forest EcoValue:
Supporting multiple forest ecosystem services through new circular/green/bio markets and value chains

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PP2. *Lombardy Foundation for the Environment – Fondazione Lombardia per l'Ambiente [FLA]*
PP4. *National Research Institute for Agriculture, Food and Environment – Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement [INRAE]*
PP5. *Slovenia Forest Service – Zavod za Gozdove Slovenije [ZGS]*
PP6. *Institute for Environmental Planning and Spatial Development GmbH & Co. KG – Institut fur Umweltplanung und Raumentwicklung GmbH & Co. KG [Ifuplan]*
PP7. *Lombardy Green Chemistry Association – Cluster Lombardo della Chimica Verde [LGCA]*
PP8. *University of Graz, Institute of Environmental Systems Sciences [UNIGRAZ]*
PP9. *Regional Centre for Forest Property Auvergne-Rhone-Alpes – Centre Régional de la Propriété Forestiére [CNPF]*
PP10. *The French National Forest Office – Office National des Forets [ONF]*
PP11. *Hozcluster Steiermark – Woodcluster Styria [HCS]*

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Glossary

tba

List of abbreviations

FES: Forest Ecosystem Service

ES: Ecosystem Service

LL: Living Lab

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Introduction

The Output Document O.2.4 Regional Roadmaps for Austria, France, Germany, Slovenia and Italy is designed to present country-specific roadmaps for the sustainable management of forest ecosystem services (FES) and the development of associated business models across these five European nations.

The document is systematically structured into dedicated chapters for each participating Living Lab (Germany, Italy, France, Slovenia, and Austria). Each Living Lab chapter is further subdivided to offer a comprehensive overview, including:

Living Lab Introduction: Presents the specific Living Lab, detailing its geographical context, topography, climate, and land-use patterns.

- ***Living Lab Introduction:*** *Gives an overview of each Living Lab.*
- ***Objectives for Forest Ecosystem Services Maintenance:*** *Outlines both the ecological and economic goals for sustaining and enhancing FES within the respective Living Lab.*
- ***Selected Development Measures for Forest Ecosystem Services:*** *Describes concrete actions and strategies proposed for promoting and safeguarding FES.*
- ***Selected Business Model Development:*** *Introduces innovative business models designed to monetize FES and support forest owners in their stewardship roles.*
- ***Expression of Interest:*** *Communicates the commitment of the forest owners to implement the proposed measures and business models.*

In essence, the document systematically outlines regional roadmaps designed to foster the sustainable management of forest ecosystem services. It provides a practical framework for translating ecological objectives into viable economic strategies and business models, ultimately aiming to support forest owners in their multifaceted role as stewards of valuable natural resources.

Project overview

Forests of the Alpine Space play a key role in climate change mitigation and resilience, providing multiple ecosystem services (ES) and environmental and social benefits such as CO_2 absorption, air pollution reduction, biodiversity enhancement, and protection against natural hazards. However, they are threatened by abandonment, climate change, and territorial degradation, which progressively reduce natural resources and the provision of forest ES (FES). Maintenance costs of Alpine forests are high, and public funds and traditional wood value chains are insufficient to cover them. Economic valuation and payment schemes for FES are widely discussed but rarely successfully applied.

The Forest EcoValue project addresses this challenge by developing innovative, sustainable business models for forest management and maintenance, supporting new bio-based value chains and ES markets, and involving different sectors, public and private actors, and citizens. Restoring and maintaining healthy forests has been recognised as a source of value for the Alpine region, while also creating business opportunities and green jobs for Alpine communities.

The project focuses on a subset of FES from the following categories:

- ***Provisioning*** *(e.g. biomass, raw materials, chemicals) with a specific focus on non-timber forest products, and on the production of woody biomass for energy, integrated into circular energy markets.*
- ***Regulating*** *(e.g. biodiversity, natural risk reduction, CO_2 absorption) concretely working on carbon and biodiversity credits, natural risk management through protective forests, and innovative environmental finance instruments such as green bonds and reverse auctions.*
- ***Cultural*** *(e.g. recreation, habitat experience, health) particularly enhancing recreational and tourism services and spiritual and cultural services.*

These services have been explored and tested within Living Labs (LLs) across five countries, located in different Alpine territories and representing diverse ecological and socio-economic contexts:

- ***Italy – Valle Tanaro, Piedmont:*** *The LL in Valle Tanaro explores innovative approaches to valorising chestnut groves, promoting non-timber forest products, developing carbon and biodiversity credits, and fostering experiential activities linked to forest and rural heritage.*
- ***France - Haute-Savoie:*** *Grand Annecy and Thonon LLs focus respectively on two aspects 1) recreational ecosystem services, enhancing the value of forests through the sale of experiences such as ecotourism, outdoor activities, and educational programmes 2) enhancing the value of water regulation services through a public-private partnership.*
- ***Slovenia – Karavanke Mountains, municipality Tržič:*** *The Slovenian LL addresses natural risk management with a focus on torrent control, advances solutions for wood biomass supply chains and promotes sustainable tourism and recreational use of forests.*
- ***Austria – Province of Styria:*** *The Styrian LL concentrates on biodiversity and habitat provision and carbon sequestration and storage through innovative financing mechanisms such as reverse auctions.*
- ***Germany – Tegernsee Valley, Upper Bavaria:*** *The German LL explores spiritual and cultural services, such as forest cemeteries with biodegradable urns, while also fostering habitat and biodiversity conservation through collaborative public–private partnerships.*

Accordingly, the project is aiming to:

- *Map and analyse the Alpine Space forests delivery capacity of FES;*
- *Identify and estimate the economic potential, define business models and FES market frameworks;*
- *Test the models/tools developed by the consortium in pilot LLs involving local players;*
- *Compare results at transnational level, identifying obstacles and facilitating factors;*
- *Analyse the need for innovative policies to foster forest maintenance, FES markets, and new value chains;*
- *Elaborate refined transferable tools/models and policy proposals to enable new markets and value chains and ensure the expected FES.*

Throughout the project, a continuous participatory process is carried out within the Living Labs. Stakeholders' active involvement in these labs is essential for co-designing and testing models and tools, ensuring that the innovative approaches are rooted in local realities. In parallel, public events and capacity-building workshops have strengthened engagement, supported knowledge transfer, and provided regular updates on project activities. This participatory and long-term approach, tested across the five territories, is

paving the way for refined, transferable tools and policy proposals that can unlock new markets and value chains while safeguarding the provision of ecosystem services in the Alpine Space.

Project duration: 36 months

LIVING LAB AUSTRIA

State of Styria

Output 2.4

Living Lab Austria

Living Lab introduction

Austrian Living Lab was defined by the boundaries of the entire province of Styria to be able to welcome as many forest owners as possible. The reason of such a broad approach was the business model of choice – reverse auction (see Reverse auction Section) – that does not only allows for it, rather requires a higher participation rate to be successful.

17 forest owners, whose applications for participation were accepted, have their forest properties located in 14 municipalities and nine districts:

- *Langenwang municipality in Bruck-Murzzuschlag district (15 applications in total)*
- *Sankt Stefan ob Stainz municipality in Deutschlandsberg district (one application in total)*
- *Furstenfeld, Sankt Lorenzen am Wechsel and Waldbach-Mdnichwald municipalities in Hartberg-Furstenfeld district (four applications in total)*
- *Kammern im Liesingtal municipality in Leoben district (one application in total)*
- *St. Peter am Kammersberg and Murau municiaplities in Murau district (five applications in total)*
- *Sankt Margarethen bei Knittelfeld municipality in Murtal district (four applications in total)*
- *Fehring municipality in Sudoststeiermark district (three applications in total)*
- *Geistthal-Sddingberg municipality in Voitsberg district*
- *Birkfeld, Gasen and Thannhausen municipalities in Weiz district (11 applications in total).*
- *One application was impossible to locate.*

Province of Styria is characterized by its rich forest ecosystems and diverse land use practices, with approximately 60 % of land area covered by forests, making it the most forested region in Austria. Approximately 87 % of forests in Styria are privately owned, 9 % are public, and the remaining 4 % are owned by municipalities. The average size of privately owned forest properties in the region is around 5 – 10 hectares, with larger holdings often found among public and communal lands.

The Styria Forestry Directorate oversees forestry management in the region, implementing national policies and ensuring sustainable practices. Local municipalities also play a role in forest management and land-use planning. Various associations exist to represent private and communal forest owners, providing support, resources, and advocacy for sustainable forestry practices. The main one is Styrian Forest Owners Association (Waldverband Steiermark), who was the principal stakeholder in the Living Lab (see ***Fehler! Verweisquelle konnte nicht gefunden werden.*** *Section). Local authorities manage municipal forests, enforce land use regulations, and facilitate community involvement in forestry initiatives.*

Objectives for FES maintenance

Ecological objectives

- *Conserve and restore degraded forest ecosystems, particularly those impacted by monocultures, overexploitation, or biodiversity loss, aiming to re-establish ecologically functional and climate-resilient forest stands.*
- *Stabilize the carbon cycle through continuous cover forestry and diversified forest structures.*

- *Enhance biodiversity by preserving and improving habitats, tree species diversity, and structural complexity.*

Economic objectives

- *Create new funding opportunities for sustainable management and ecosystem service provision.*
- *Demonstrate viability, cost-efficiency and socio-ecological effectiveness of the proposed business model(s).*
- *Simplify procedures and improve advisory services to make sustainable forestry and ecosystem-based business models more accessible—especially for small-scale forest owners.*
- *Strengthen interest in active forest management, especially among owners with low management intensity or limited technical capacity.*
- *Support small-scale private forest owners, especially in implementing climate-adaptive and biodiversity-promoting measures.*
- *Ensure continuity of the pilot beyond the project duration, through stakeholder commitment and financial sustainability.*

Priority setting of objectives for the road map

At first, the FES from the pilot should be further established, so forest owners can get accustomed to the procedure. We found the communication of this new possibility of income for forest owners to be quite challenging, so an effort to establish this new model should be taken. Once established, the FES addressed can be expanded with measures like outdoor activities, non-wood products, etc.

As next step, the topic of carbon credits can be touched, as currently more and more projects address this topic.

Selected development measures for Forest Ecoystem Services

In the Living Lab, we focused on the following measures:

- *Provision of timber, fire- and fuelwood: integration of management practices that enhance non-instrumental FES while not restricting continuous wood provision*
- *Provision of habitats for wild plants and animals: One of the simplest and most used methods to increase biodiversity in the forest is to leave **biotope trees** or **standing/lying deadwood** untouched in the forest. This measure helps to increase biodiversity in the forest as the tree trunk serves as a habitat. A tree should be left untouched for at least 20 years. The tree must be located in a forest so that it can contribute to the biodiversity of the forest. In the event of non-compliance, the forest owner must notify this and either reimburse the subsidy or set a new deadline.*
- *CO2 storage in forests: **Continuous cover forestry** to stabilizes carbon cycle and ensures that carbon can be absorbed from the atmosphere more quickly. Transformation from the unnatural form of monoculture forest to a mixed forest helps to make the forest area more stable and resilient to infestation and disease as well as a changing climate. Forest owners who have a secondary spruce monoculture stand younger than 60 years in their forest and want to transform it can apply for this measure. This measure requires the creation of a mixed forest (optionally through natural*

regeneration). The forest conversion must be initiated within 5 years of signing the contract (i.e. the contract period is 5 years). A deadline for the start of conversion will be specified in the contract. In the event of non-compliance, the forest owner must notify this and either reimburse the subsidy or set a new deadline.

Further measures that could be added in the future:

- *Protection of natural regeneration: as climate resistant tree species are actually present, but suffer dramatic loss by the influence of wildlife population, protection of natural regeneration is a cost effective measure of building climate resistant forests (by individual protection, fencing or repellents)*
- *Further ecosystem services such as water retention*
- *Compensation measures for land use impacts*
- *Non-wood products such as mushrooms, game, berries or resin*
- *Recreation and leisure services (e.g., nature tourism, hunting, outdoor activities)*

An effect one must be aware of is that FES should not interact in a negative way with providing timber. As using timber – especially in the building sector – is an effective and sustainable way of carbon storage and climate change will probably lead to shortage of resources, this must be an area of focus.

Selected business model development

Reverse auction

Reverse auctions are a form of organizing a payment for ecosystem services (PES) scheme, where landowners bid the price for providing ecosystem services or implementing sustainable management measures aimed at FES provision. Such a model promises higher cost-efficiency, as landowners are invited to state their opportunity costs in the competitive context, i.e., they are motivated not to overestimate their costs. There are many reverse auction types, and discriminatory price auction is considered to be the most fitting one to the context of forests in Alpine area, due to their high heterogeneity that influences opportunity costs. In such an auction, each bidder that falls within the budget threshold will be paid the price that they asked for. This way it is also possible to include other ecological and social criteria to evaluate effectiveness of the bid. This approach also allowed to reward forest owners who already have experience with forest restoration and conservation, as they are nudged towards thinking about their real opportunity costs, not profit generation, while those who had no prior experience were encouraged to look at their forests through the lens of these practices. In the Living Lab, we tested two measures for biodiversity and carbon cycle stability, however, the list of measures could expand with growing familiarity with the model (see above).

- *Existing market framework: for timber provision, the market framework is well established in Styria. Regarding FES, there are certain subsidies, however small-scale forest owners are often excluded. This is one of the strengths of our model, as bureaucracy is in comparison to other fundings very limited.*
- *Competition: competition during the pilot was above expectations, 5 of 41 applicants were funded.*
- *Potential subsidies:*
- *In Austria, several subsidy schemes exist that relate to forest conversion and climate-adapted management. There are available subsidies for deadwood management, but due to their administrative requirements they remain out of reach for many small-scale forest owners. Based on*

our stakeholder consultations, there are currently no explicit subsidies dedicated to the adoption of continuous cover forestry or to the conversion of spruce monocultures into climate-fit mixed forests aimed at carbon-cycle stabilisation (i.e. carbon sequestration and long-term storage). However, forest owners can receive financial support when planting climate-fit tree species in line with the national Dynamic Forest Typization framework (see O.2.3, Development Scenario Section). These measures, while valuable, only partially address the structural and silvicultural efforts required for a full transition towards continuous cover forestry.

- *Potential revenues: forest owners get financial reward of the requested amount in the auction; the providers of the funding get sustainable marketing possibilities.*

Expression of interest

Our financing partner, Raiffeisen Landesbank Steiermark, has shown great interest in the project, as it opens up new opportunities for green finance and the development of sustainable investment instruments. Pilot action funding provided by the bank was a one-time payment. For future rounds of reverse auction, new funding must be sought.

Our most important partner is the Styrian Forest Owners Association (Waldverband Steiermark), which primarily represents small-scale private forest owners throughout the region. Its involvement ensured a close connection to practical forest management and facilitated the participation of local forest owners in the implementation of sustainable and multifunctional forestry measures. In addition, the Styrian Forest Association will ensure the continuation and follow-up of the measures defined in the Living Lab Styria beyond the project period, thus guaranteeing a long-term impact and commitment effect.

Five forest owners, who won the auction, got funding for the biodiversity and carbon stability measures, as described above. Six contracts (five for biodiversity measure and one for carbon stability measure) were signed between forest owners and the Styrian Forest Owners Association. In case of biodiversity measure, forest owners commit to keep the deadwood and biotope trees they applied with for at least 20 years, and in specific cases for longer, when a longer period was mentioned in the application. In case of carbon stability measure, a forest owner is committed to introduce the new species as specified in the application via natural regeneration and planting within the next 5 years after the contract signature.

Discussions with representatives of the wood processing industry revealed strong interest in the topic, particularly with regard to the integration of ecosystem services into business models and sustainability strategies. Supporting Organizations were:

- *MM Holz Leoben*
- *Biobase GmbH*
- *Karl Drdsler (Unternehmer)*
- *Schaffer Holz*
- *Rustler Immobilientreuhand GmbH*
- *Annonym (Mit Unterschrift)*
- *Forst Kalwang*
- *MM Forsttechnik*
- *Kurt Liskonig (Alpenverein)*

It is crucial to involve both sides – the providers of ecosystem services (forest owners) and the financing partners (funding agencies) – from the outset and to clearly communicate the mutual benefits. The increasing

importance of sustainability reporting and the growing awareness of ecosystem services in the financial and industrial sectors form a stable basis for cooperation and for scaling up the impact of Forest EcoValue Living Lab activities.

Number of letters of commitment collected: 9

LIVING LAB FRANCE

Grand Annecy &

Thonon Agglomeration

Output 2.4

Living Lab France

Living Lab Introduction

Vision and Mission of the Living Lab

Vision

Grand Annecy is a highly touristic area where forests play an important role in regional attractiveness. However, climate change threatens these forests, and many tree species may experience high mortality rates. To ensure that forests continue to provide ecosystem services, especially recreational value and landscape permanence, management actions must be undertaken.

The vision of the Living Lab is to engage recreational users in forest management, fostering their sense of stewardship and ownership over the challenges facing natural ecosystems.

Mission

The mission of the Grand Annecy Living Lab is to test specific financial mechanisms that integrate recreation-supporting practices into forest management. These mechanisms aim to sustain in the long-term health of forests, facilitate dialogue between foresters, the general public, and other stakeholders, and generate continuous economic and social benefits for local communities.

Location and Environmental Features

The Grand Annecy Living Lab is located in the Haute-Savoie department of southeastern France, within the Grand Annecy metropolitan area. The Grand Annecy Living Lab encompasses a territory that stretches from the shores of Lake Annecy to the surrounding pre-Alpine massifs, including the Bauges and Bornes ranges. Elevations vary from around 400 m a.s.l. in the lake basin to over 2,000 m a.s.l. along the mountain ridges. This altitudinal gradient supports a diverse range of habitats and forest types, from mixed deciduous stands at lower elevations (dominated by beech, oak, and hornbeam) to montane and subalpine forests of fir, spruce, and pine.

The highly diverse environmental conditions (altitude, exposure, substrate, etc.) give rise to rich and varied ecosystems. The area's climate is characterized by strong mountain influence with abundant precipitation, particularly in autumn and spring, but with growing irregularities due to climate change, such as longer summer droughts and reduced snow cover. Forests play a central ecological and recreational role, surrounding one of France's most visited natural landscapes. They provide key ecosystem services, and many forested zones are included within protected areas such as the Parc naturel régional du Massif des Bauges and Natura 2000 sites.

However, climate change threatens these forests and ecosystems, and many tree species may experience high mortality rates. To ensure that forests continue to provide ecosystem services, especially recreational value and landscape permanence, management actions must be undertaken.

Ownership Structures

Forests are an integral part of Grand Annecy, with nearly 45% of its surface area covered by woodland, representing more than 22.000 hectares of forest. Forest ownership within the Grand Annecy Living Lab area is characterized by a high degree of fragmentation, reflecting the complex historical and social patterns of

land use in the region. There is a balanced proportion between private and public forest with 42% of forests being public and 11.800 people among private owners accounted for in the remaining private percentage. Private forests are often in small plots of incongruous shapes (narrow and slope oriented) owned by families or individuals who may no longer reside locally, are of older age, resulting in limited active management due to the sheer difficulties of understanding property rights, retrieving plot boundaries and facing economic brakes due to the small size of forests. Public ownership is primarily represented by municipal and state forests, through agreements with the Office National des Forets (ONF). The public forests in the peri-urban massif serve a protective function, welcome the public and contribute to the heritage and landscape. It mainly consists of continuous plots larger than 50–100 ha.

In recent years, with the help of the Centre National de la Propriété Forestière (CNPF), collaborative approaches have gained importance, with local initiatives encouraging collective management and shared stewardship practices among smallholders who gather in Association Syndicales Libres de Gestion Forestière (ASLGF). These efforts aim to improve the efficiency of silvicultural operations, and other management actions.

Existing Governance Structures

The State in the region (DREAL, DRAAF, DDT) represent the government departments responsible for forests in Auvergne Rhone-Alpes and in Haute-Savoie. Together with forestry stakeholders, namely ONF and CNPF, they define the guidelines for forest management, in compliance with the laws and framework texts defined by the ministries. The AURA Region also participates in regional forestry policy as a representative of local authorities at regional level.

Grand Annecy is the urban area surrounding the city of Annecy. As an urban community, Grand Annecy has mandatory powers, as well as optional and discretionary powers. The latter are decided in consultation with the municipalities, which may transfer them to Grand Annecy. This authority does not own any forests but has a role in influencing the management of surrounding forests. It implements a forestry strategy and has jurisdiction over tourism in the area. Municipalities in the Grand Annecy directly represent the local authorities and could sometimes own a communal forest.

The ONF is the direct manager of all public, state-owned and communal forests. As manager, it is responsible for the development, exploitation and monitoring of public forests. A departmental service ensures the local implementation of forest management thanks to forestry technicians.

The CNPF is the public institution responsible for promoting sustainable management of private forests. It does not directly manage private forests but supports private owners in acquiring the tools they need for sustainable forest management. Private stakeholders manage their own forests, receiving advice, authorizations when necessary, and following regional regulations for forests larger than 20 ha, with oversight from the CNPF. Local forest experts and managers also support owners with larger operations or those grouped in forest owner associations (ASL). There is currently only one ASL in Grand Annecy, La Forestière Val Laudon, although other types of family-owned forest associations exist (GF). The Union of Private Forest Owners (Union des Forestiers Privés UFP74) represents private forest owners and their interests in Haute Savoie.

The Living Lab doesn't rely on existing governance concerning forest ecosystem services but the aforementioned organisations, including municipalities, conurbation, ASLGF, UFP74, public administration (CNPF, ONF), and third-sector organizations (tourism, sport, environment), are already working together on environmental, tourism and forestry issues. The Forest, Wood and Tree Meetings, launched by elected officials

from Grand Annecy during the Climate Biennial in October 2023, bring together experts, forest managers, owners, users and municipalities. This strategy focuses on seven priority issues, including the preservation of forest ecosystem services.

Constraints and Opportunities

Due to climate change, Alpine forests are becoming increasingly vulnerable. Several forest species, animal species and plant species are under threat, as are the many services provided by the forest. Many key constraints are identified :

- *impacts of climate change on forest ecosystems, especially damage from bark beetle infestations in Grand Annecy;*
- *high operational costs due to mountainous and fragmented landscapes;*
- *volatility in wood product prices, weakening the timber industry's economic model;*
- *decline of local wood industry;*
- *difficult structuring due to the fragmentation and dispersion of private forest land;*
- *and the absence of a coordinated market infrastructure and scheme for forest ecosystem services.*

However, the region also presents significant opportunities for developing a framework for promoting forest ecosystem services. Grand Annecy :

- *benefits from a high-income economy supported by both local residents and tourism;*
- *hosts numerous sporting events with a lot of people practicing outdoor activities daily;*
- *has a strong cultural tradition of timber architecture (such as cabins);*
- *features a predominantly forested landscape, composed of mixed deciduous–coniferous forests;*
- *and enjoys growing interest from the general public in forest-related issues.*

Objectives for FES maintenance and development in the Living Lab area

The feasibility assessment for the Grand Annecy Living Lab evaluated the technical, ecological, and economic viability of a financial disposal that engages recreational users in forest management, fostering their sense of stewardship and ownership over the challenges facing natural ecosystems. As the Grand Annecy forests will require a series of investments to maintain or even improve the level of the forest ecosystem services, we aim to increase funding opportunities for foresters in Grand Annecy, thereby improving forest profitability by decreasing costs and making it easier to implement sustainable management practices.

The Living Lab aims to allocate a modulated share of the tourism tax to fund actions that support foresters and forests by integrating the issues of tourism and outdoor activities in the region.

The projection of the financial mechanism was built through 1) the definition of measures to preserve forest ecosystem services targeted at recreational users 2) a participatory process involving local stakeholders and partners to ensure alignment between ecological objectives, market opportunities, and community needs.

A central feature of the model is the financial compensation provided by the tax revenue as an economic balancing factor. This tax is used to offset the higher costs due to tourism needs and also in marginal and low-productivity areas, ensuring that revenues from timber could remain competitive with market prices.

Key Findings – Quantitative and Qualitative Highlights

- ***Managed Surfaces**: depending on the actions undertaken, there is an important variation in benefiting surfaces. In terms of forest owners reached (mixed public and private) there might be potential for 50 owners totaling to a minimum 100ha.*
- ***Economic Potential:** an estimate of the amount of tourist tax collected (approximately 3 million nights per year in the Grand Annecy area) could be started at €60,000 annually to co-finance these actions and the activities provided by technical partners.*
- ***Carbon and Biodiversity Benefits:** this innovation is targeted at actions toward conciliation with recreational users. Biodiversity and carbon benefits are only expected as long-term co-benefits of sustainable management; management and adaptation of forests to climate change, increase of carbon stored in end-products, sustainable forestry management plan, etc.*
- ***Employment Creation:** sustain the forestry sector by enhancing profitability (i.e. decreasing constraints) in managing forests thus working toward maintaining jobs that are threatened in the current weak state of the forestry sector.*
- ***Diversified Value Chains:** actions target various sectors centered in the intersection of recreation and forest management, thus, financing goes through professionals from communication and wood production to large-scale planning.*
- ***Market Sensitivities:** strong independence of market when voted and implemented, sensitivities linked to tourism attractivity. A decrease is highly unlikely in the area.*
- ***Public Support Role:** strong role of Grand Annecy conurbation in engaging discussion with the tourism sector. As the tax and the modulation dedicated to the proposed scheme are voted by the Grand Annecy Community Council, a change in leadership could affect the choice of this scheme.*
- ***Key Challenges:** high operational costs of fine-tuned actions, sensitive discussion with the tourism tax collector, confirm the compliance with financial regulation in particular on the redirection of funds collected through tourist tax towards environmental maintenance and conservation operations.*
- ***Compatibility and sustainability:** this work could be fully integrated into existing frameworks for public forests (forest management scheme, mid-term review) and private forests (simple management plan). Eligibility criteria for forests will be based on the existence of at least these management frameworks.*

Selected development measures for Forest Ecosystem Services

The services provided by the forest around Annecy are in high demand (landscape, recreation, wood, water, biodiversity), but the way they are currently taken into account (markets, regulations) does not allow for a fair valuation of these services.

- *Both private and public forest owners welcome a new approach to reducing costs and increasing the currently very low margins for sustainable forest management ;*

- *The ONF and the CNPF would strongly support this innovative approach, which promotes the services provided by forests. The technical measures can be implemented by public and private forest managers (ONF – CNPF supporting forest experts), who have the expertise and technical resources to do so.*
- *Local authorities and elected officials are interested in the approach and model of the scheme because it allows them to invest in the forests in their area while maintaining economic activity. The use of tourist tax, which is possible in Greater Annecy, varies greatly from one political area to another.*

The context is not particularly favourable, given that services that are currently provided free of charge will have to be paid for or monetized. Furthermore, the current political climate does not encourage greater consideration of those issues. The main barrier is having a financial and regulatory framework in place that overcomes these constraints:

- *Level of community participation: few collaboration between stakeholders to promote this ecosystem service. For instance, bicycle rental company operating independently and/or without consultation with forest managers ;*
- *Lack of targeted funding: there is no existing public or private funding to directly promote forest ecosystem services, particularly those related to cultural and recreational services. Other public or private funding exists for biodiversity conservation and risk reduction (Natura 2000 about biodiversity, and RTM for public protective forests)*
- *Lack of knowledge: there is still a lack of knowledge about the status and assessment of ecosystem services, both in terms of accessible data and how to monitor them. LIDAR technology to significantly improve forestry measurements is not applicable to measure recreational forest ecosystem services ;*
- *Environmental regulations (regulatory, contractual): exist for the preservation of certain sensitive ecosystems or endangered species, but they are not exhaustive in terms of the integration of forest ecosystem services.*
- *Structure of the approach: some actors are working on forest ecosystem service, but indirectly (Sylvacctes). This could create confusion, even though there is no real framework in place to deal with these issues.*

The feasibility assessment demonstrated that the integrated business model is both technically viable and ecologically beneficial, offering a pathway to enhance forest ecosystem services while creating diversified income streams. The results highlight how a combination of targeted forestry interventions, value chain development, and ecosystem service monetisation can deliver significant local benefits. The integration of tourism tax modulation was identified as a key mechanism to balance higher management costs in low-production or very frequented areas, ensuring economic sustainability for private and public owners in the context of climate change.

*The technical measures defined by involved stakeholders will be implemented by public and private forest managers. The table below summarizes the main thematic areas, expected impacts, and the priority measures identified for implementation (see **Table 1**).*

***Table 1**: Expected impacts and priority measures for the main thematic areas.*

Theme	Key Findings from FEAS	Expected Impacts	Priority Measures
Recreational users security	*Recreational users often do not respect access restrictions during wood harvesting operations.*	*Reduced intrusion of recreational users during wood harvesting; improved safety for recreational users.*	*Implement surveillance; enhance communication about wood harvesting operations; organize trail rerouting.*
Decrease impacts of recreational users	*Recreational users cause erosion by repeatedly using the same trails and by creating new paths. Forest areas are used not only extensively across space but also continuously throughout the day and night.*	*Decrease in the number of trails; increase in biodiversity quietness; improvement in soil protection.*	*Trail management agreements; trail closure and renaturation.*
Ensure the provision of recreational value and landscape quality.	*With increasing constraints, conflicts, and climate change–induced impacts, foresters are under growing pressure and may choose to reduce opportunities for recreational use of forests. The abandonment of forest management or economically driven decisions could also result in a decline in landscape quality.*	*Ensure long-term access to forests for recreational users and preserve a lasting landscape quality for tourists.*	*Trail and outdoor event management agreements; reduce the drawbacks of one-sided management approaches.*
Recreational users stewardship	*Misunderstanding of the forestry sector, forest ecosystems, biodiversity, and their associated impacts is a major limitation to effective forest stewardship by both the general public and the private sector.*	*Enhanced awareness of forest ecosystems, forestry practices, and the ecological impacts of individual users.*	*Create educational and informational materials; plan and conduct public engagement events.*
Local development	*Ownership fragmentation limits economies of scale and forests management opportunities*	*Growth in membership of the local forest owners' association*	*Encourage greater forester membership in associations; strengthen implementation of sustainable forestry plans*

Selected business model development

The integrated business model developed for the Grand Annecy Living Lab is the result of a participatory and iterative design process, combining local stakeholder input with technical and economic projection.

Its purpose is to maintain and enhance forest ecosystem services while creating diversified income streams that sustain the forest owner economy and preserve the tourist recreational service. It aims to allocate a share of the tourism tax that has been in place since 2017 to fund actions that support foresters and forests in coping with the impacts of tourism and outdoor activities in the region. It is also a new way of investing in the forest in the context of climate change.

Two possible solutions have been proposed:

- *either by increasing the tax by 2 or 3 cents per tourist overnight stay*
- *or by allocating a percentage of the current tax between 1% and 2%*

The model is built on two complementary pillars:

1. ***Active land stewardship and climate-smart forest management:** targeted interventions designed to promote a sustainable forest management in order to adapt the forest to climate change*
2. ***Development of services: deliver measurable impacts on recreational and landscaping features,** biodiversity issues, and other ecosystem services, potentially monetised through the reallocation of tourist tax and reinvestment mechanisms for landscape maintenance.*

The following paragraph provides a structured overview of the business model's operational and market dimensions. It outlines the main target markets, revenue potential and key subsidy mechanisms, together with the cost structure and possible funding sources. Strengths and weaknesses of the model are assessed in light of market dynamics and policy frameworks. Finally, the section highlights the enabling conditions required for implementation, including governance tools, capacity building, and public–private co-financing mechanisms

Target market and competition

- *Tourism: revenue generated from the tax collected from accommodation in the area of Grand Annecy (tourism tax)*
- *Competition: there is potential competition with the current allocation of tourist tax to tourist offices (the primary beneficiary of this tax). This competition is financial in nature and does not include the technical dimension, for which there is no competition.*

Potential revenues and subsidies

- *Annual revenue potential initially: €60.000 to €90.000/year from tourism tax*
- *Public co-financing could arise in parallel as well as financing of other ecosystem services*

Cost structure and funding sources

- *High initial investments: certification, tourism product design, marketing, infrastructure.*
- *Ongoing operational costs: specific organizational expenses related to the funded actions including facilitation of governance body meeting, selection of forests for funding, management of financial flows and verification of supporting documents*
- *Funding mix: revenue from tourism tax, public regular subsidies for CNPF/ONF or Grand Annecy organization.*

Strengths and weaknesses

- *Strengths: based on real needs of foresters, aligned with the vision of the conurbation for recreational services.*
- *Weaknesses: only covers existing costs, limited to forest harvesting schemes; does not directly enhance profitability, do not rely on an existing collaborative approach between foresters and the tourism sector.*

Enabling factors

- *Private funding with public organizations overseeing;*
- *Foresters can rely on an extensive network and are well acquainted with the territory;*
- *Integration and alignment with existing management frameworks in public and private forests.*
- *Aggregation tools for ownership mobilization are existing and public forests are already well organized.*

Strategic Objectives, Measures and Implementation Matrix

*This section brings together the ecological and economic objectives of the Grand Annecy Living Lab and translates them into concrete measures, actions, expected effects, and responsibilities (see **Table 2**). It ensures a direct and operational link between the strategic vision and on-the-ground implementation.*

The Grand Annecy forests are heavily affected by recreation, and directing part of the tourism tax toward forest stewardship is expected to reduce ecological impacts, raise public awareness, and support biodiversity-friendly forestry practices. By easing profitability pressure, this funding can also help foresters adapt to climate change and maintain healthier forest ecosystems. Economically, the initiative aims to diversify revenue for forest managers, cover the extra costs caused by high visitor numbers, and enable more sustainable management practices that ultimately improve forest value, economic returns, and carbon storage, while strengthening public understanding of the forestry sector.

***Table 2:** Strategic Objectives, Measures and implementation Matrix.*

Objective	***Measures***	***Actions***	***Expected Effects***	***Indicators***	***Actors***
Support for securing the surroundings of frequently used trails and on forestry worksites	*Implementation of safety measures on forestry worksites and specific*	*Outreach / awareness-raising around forestry worksites ; Felling of hazardous trees ; Communication materials or detour signage; Specific equipment for trail marking, diversion, and closure*	*Encourage forestry; improve operating conditions and reduce associated risks*	*Nbr of worksites/year covered*	*SME ; Owner ONF/CNPF ;*
Adaptation of tracks to recreational use standards	*Restoration of forest tracks to recreational use standards*	*Machinery operations with "special finishing"*	*Provide better access routes for recreational activities in the forest and improve visitor services.*	*Nbr of tracks (mL) / year*	*SME ; Owner ONF/CNPF ;*
Reducing the impact of forestry on the forest ecosystem and its services	*Use of low-impact silvicultural methods in areas with recreational value*	*Additional cost for timber extraction / skidding using animal traction*	*Less public opposition to logging; less impact on the functioning of the forest ecosystem*	*m3/year supported*	*Forest owners and managers*
Decrease recreative users impact on forests	*Measures to reduce the impacts of recreational users using the same trails and by creating new paths.*	*Consultation, designation, and formal agreement on a single trail; Restoration works, other works or cleaning, redirection materials and installation;*	*Decrease in the number of unauthorized trails; increase in biodiversity quietness; improvement in soil protection.*	*Trail management agreements; trail closure and renaturation.*	*Forest owners and managers ; sports organizers*

		Dismantling of unsuitable / unauthorized equipment			
Enhance sustainable forest management	*Share of good practices for preserving forest ecosystem services*	*Technical study; Communication materials*	*Improving forest owners' engagement in sustainable and multifunctional forest management through better knowledge*	*Nbr of forests managed involved in the scheme*	*Forest owners and managers ;*

Implementation framework

The implementation of the Grand Annecy Living Lab's integrated business model will follow a phased approach, ensuring that technical capacity, stakeholder engagement, and financial resources are aligned with each stage of development. The framework prioritises early demonstration of tangible results to build trust and attract investment, while progressively scaling up the scope and impact of activities.

1. *Mapping and managing priority forest ecosystem services: identifying localized services and prioritizing areas within the territory where intervention is most needed.*
2. *Relying on innovative approaches to support new measurement methods and monitoring in forestry and regional initiatives (LIDAR)*
3. *Strengthen cooperation between forest owners and local stakeholders: create organizational models and committees to decide how this system will be run.*
4. *Integrate the ecosystem services identified through sustainable forest management actions defined by all partners.*
5. *Directing financial resources: allocating a portion of the tourist tax to cover management costs and support the implementation of new initiatives.*
6. *Promote sustainable and adaptable planning: use tools to ensure the long-term maintenance and management of these operations (e.g. 'forestry contracts', participatory governance), in particular to enable better consideration of the uncertainties associated with climate change and to strengthen cooperation between stakeholders.*
7. *Communicate assessment results to stakeholders, policymakers, and the general public through reports, workshops, and outreach activities. Involve stakeholders in interpreting results and developing management strategies that promote sustainable provision of FES.*

Short-term (Years 1–2) – Foundation and Piloting

Key Actions

- *Continuous discussion with Grand Annecy conurbation for the promotion of the tourism tax increase and destination;*
- *Draft guidelines and functioning;*
- *Voting in the Grand Annecy budget.*

Funding Sources*: Interreg Forest EcoValue. CNPF and ONF continuous activities of development.*

Coordination Mechanisms: *Working group dedicated to this topic*

Medium-term (Years 3–6) – Scaling and Market Entry

Key Actions

- *Implement governing bodies and functioning;*
- *Launch pilot interventions in selected forest areas;*
- *Feedback of pilot intervention and technical guidelines.*

Funding Sources: *Tourism tax form the Grand Annecy conurbation professionals*

Coordination Mechanisms: *Formalise a governance body with conurbation, cities, foresters and tourism sector.*

Long-term (Years 7–15) – Consolidation and Innovation

Key Actions

- *Rolling bases of actions implemented in many forests of Grand Annecy;*
- *Augmentation at will of the funds allocated to the operation;*
- *Diversify markets for other ecosystem service, for instance biodiversity and water;*
- *Develop the initiative in other conurbation of larger scale.*

Funding Sources: *Stable revenue streams from tourism tax and punctual for development (FEADER, Agence de l'eau)*

Coordination Mechanisms*: Establish long-term governance agreements among stakeholders to maintain cooperation and adaptive management capacity.*

Expression of Interest

The participatory process carried out in the Grand Annecy Living Lab has fostered the involvement of a diverse network of stakeholders who could potentially adhere to the integrated business model. While no formal agreements have yet been established, multiple actors have expressed interest in principle and identified possible roles they could play in future implementation.

Both private and public forest owners welcome a new approach to reducing costs and increasing the currently very low margins for sustainable forest management. While the implementation workforce is already in place, it is facing increasing work overload pressure, particularly due to the growing impacts of climate change and societal demands. Additional funding sources would allow for the employment of more workers to support these efforts.

The ONF and the CNPF would strongly support this innovative approach, which promotes the services provided by forests, which are currently underappreciated.

Local authorities and elected officials are interested in the approach and model of the scheme because it allows them to invest in the forests in their area while maintaining economic activity. The use of tourist tax, which is possible in Greater Annecy, varies greatly from one political area to another.

Potentially involved stakeholders include:

- ***Municipalities:*** *support for governance, integration into local development strategies, recognized interface between stakeholders, access to public funding.*
- ***UFP74 and ASLGF:*** *provision of intervention areas and activities, communicating power through their network.*
- ***COFOR:*** *communicating and lobbying power through their network.*

- ***Forest management and wood transformation sector:*** *provision of interventions areas and implementation of activities.*
- ***Monitoring and marketing entities:*** *oversight of certification, promotion, and market development.*
- ***Financial supporters –*** *Private companies, banking foundations, and associations willing to sponsor or co-finance activities and push forward development of new activities.*
- ***Tourism operators:*** *Office du Tourisme d'Annecy and others are involved per se, can communicate, disperse information and strengthen the process*
- ***NGOs:*** *are able to be part of the governance, could serve as an scaling organization through space or across issues*

This network—if formalised through territorial pacts, forest agreements, or multi-stakeholder consortia—could provide a solid foundation for coordinated implementation, combining technical skills, land access, and promotional capacity to deliver the Living Lab's objectives.

LIVING LAB GERMANY

Tegernsee Valley & Tdlzer Land

Output 2.4

Living Lab Germany

Living Lab introduction

The German Living Lab is a real-world laboratory in Upper Bavaria, south of Munich, extending across parts of the administrative districts of Munich, Miesbach, Bad Tdlz-Wolfratshausen, and Garmisch-Partenkirchen. It consists of two main parts managed by different private forest owners:

- *Living Lab 1 Endlhausen, which includes lands of the Archdiocese of Munich and Freising, and*
- *Living Lab 2 Waakirchen, a forest area owned by a private individual*

The study area of the Living Lab is located in a scenically diverse region that extends from the Alpine foothills into parts of the Northern Limestone Alps (s. Figure 1). This geographical location leads to remarkable topographical diversity. While some sub-areas like Endlhausen and Sauerlach are characterized by relatively flat terrain, others, particularly the Waakirchen area, have a distinct hilly structure with steep slopes. The elevation varies considerably, ranging from 591 meters to 1328 meters above sea level. The climate is predominantly humid continental, defined by warm summers, cold winters, and year-round precipitation. Within the Living Lab, two Bavarian climate regions can be distinguished: the Alpine Foothills, which make up 53% of the area, and the Northern Limestone Alps with 47%. In the alpine region, precipitation is higher and temperatures are on average lower than in the foothills. The mean annual temperature fluctuates between about 7.9°C in the Alpine Foothills and 5.7°C in the Alps. The annual precipitation also varies greatly, averaging between 1100 mm and up to 2000 mm in higher elevations.

The analysis of land use in the study area shows a clear dominance of forest. Forest areas account for 53.43% of the total area, underscoring the central importance of the forest as an ecosystem and economic factor in this region. In second place is agricultural use, which covers 26.52% of the area and is thus also an essential component of the landscape and the local economy. Area without vegetation, such as rock or gravel surfaces, comprise 6.26%, while settlement and urban areas account for 6.24% of the total area. Infrastructure, including roads and paths, occupies 3.05% of the area. Water bodies such as rivers, lakes, and ponds take up 2.69%. Moors and swamps play a special role; although they cover only 1.47% of the area, they are of great importance for biodiversity and the water balance. The remaining 0.34% is attributed to other uses such as heathland or open-cast mining. This distribution reflects the rural and nature-oriented character of the Living Lab.

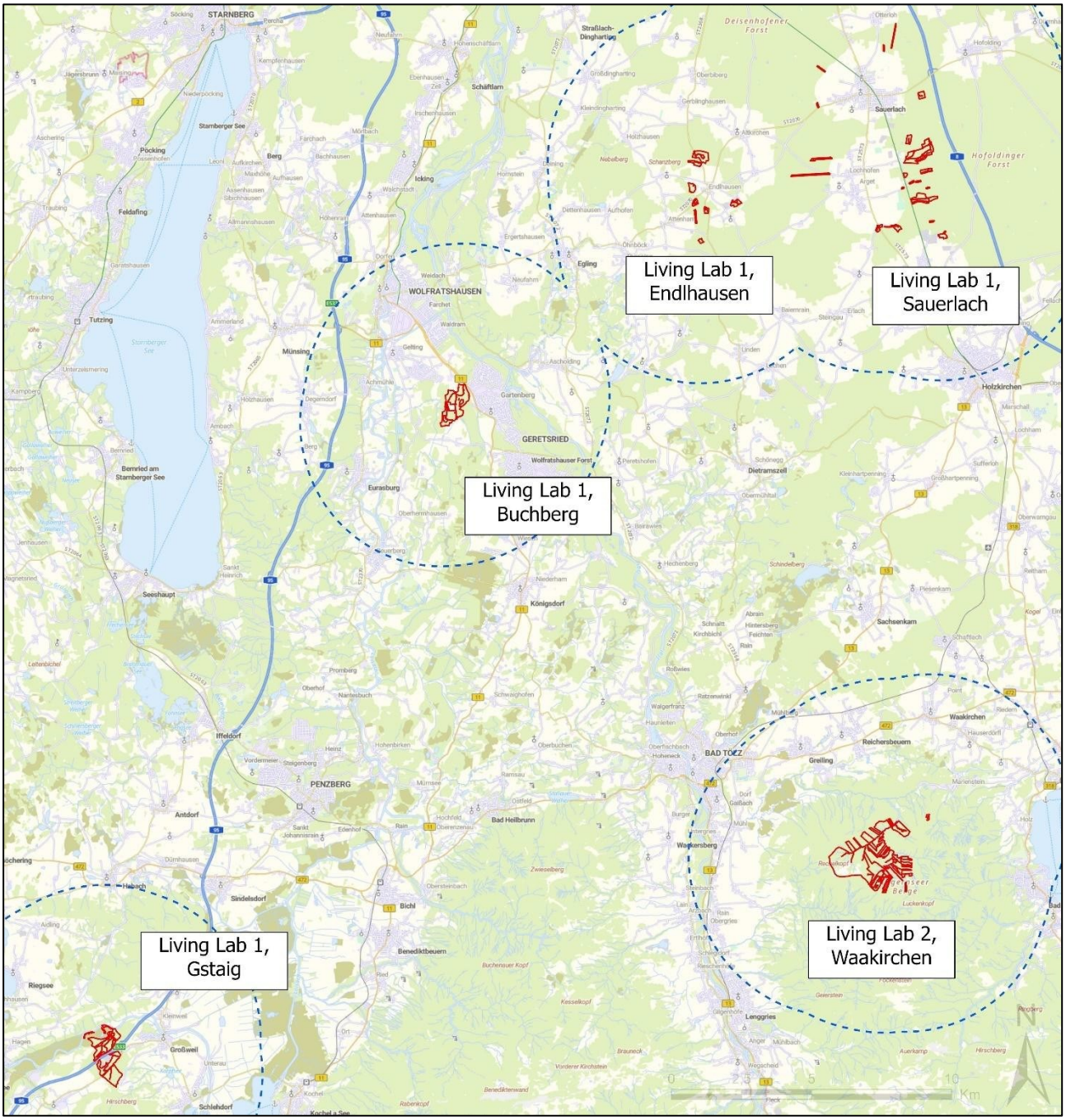

Figure 1: *Overview map of the Living Lab areas (© 2025 basemap.de).*

Living Lab Endlhausen (Buchberg)

Objectives for FES maintenance and development in the Living Labs

The ecological objectives according to the feasibility assessment (O2.3) are centered on the establishment and maintenance of healthy, resilient forest ecosystems that can provide a multitude of benefits. The foundational goal is the creation of stable, mixed, and multi-layered permanent forests ("Dauerwélder"). This approach is seen as the key to achieving further ecological targets. By cultivating structurally rich stands with diverse, site-adapted tree species of varying ages, the forest owners aim to ensure a long-term, sustainable supply of wood biomass while ensuring that harvesting rates do not exceed natural growth. This management style inherently enhances the forest's resilience to climate change impacts such as storms, drought, and pest outbreaks.

Beyond wood biomass production, the forest in the Living Lab is partly managed to support further ecosystem services. For outdoor recreation, the forest is managed to offer high-quality recreation opportunities, balancing tourism with nature conservation through well-maintained trails and visitor guidance.

Another objective is to provide rich habitats for wild plants and animals by retaining habitat trees, enriching deadwood, promoting very old "Methuselah" trees, and maintaining structural diversity, including open clearings and species-rich forest edges.

Concerning the provision of drinking water, near-natural forest soils are maintained to act as effective filtration and storage systems, ensuring a supply of clean drinking water. To support the maintenance of soils, riparian buffer zones around springs should be protected and careful harvesting techniques should be applied to prevent pollution.

Regarding the protection against natural hazards the aim is to protect people, infrastructure, and property by promoting sustainable forest structures. Forest management enhances protection against natural hazards by establishing and sustaining climate-resilient, storm- and drought-tolerant stands.

Furthermore, an ecological goal is to support the forest's role in climate regulation. The promotion of permanent mixed stands with extended rotation periods is designed to maximize the carbon sequestration and storage capacity of the living biomass.

The economic objectives are designed to create new value chains that financially support the ecological goals. A central challenge identified is that forest owners bear the costs of providing numerous public ecosystem services without receiving direct or indirect payment for these services. The primary economic objective is therefore the internalization of positive externalities, which means finding ways to monetize these services. Therefore the goal is to develop business models where customers pay not just for a product such as timber, but also for the "added value" that results from sustainable forest management, meaning ecosystem services such as clean water or carbon storage.

To achieve such payments, a key strategy is the diversification of revenue sources. By establishing business models that are independent of timber sales, the forest operation can minimize its financial risk from volatile timber prices, pest infestations, or storm damage.

For any new business idea to be successful, it must be financially viable. Therefore, another objective is to maximize the contribution margin of these new ventures. After covering their own costs, these new services should generate a positive profit that can be used to co-finance other essential forestry tasks, such as maintaining young stands, avoiding soil compression or reducing timber extraction. Finally, these innovative models are intended to increase the long-term company and "brand" value. By positioning the operation as

a modern, forward-looking provider of multiple ecosystem services, the owners aim to enhance their public image and reputation. This positive branding can, in turn, have a beneficial impact on traditional timber sales and make the business more attractive to future employees and partners, increasing its overall value.

In the Living Lab Waakirchen the objective is to foster environmental and sustainability education (as a cultural service) by using stable-mixed forests as natural school for education purposes. Concerning economic objectives, it is the goal to keep and generate indirect income (e. g. via VNP and FNR-subsidies), which finances the additional efforts of the forest owner to supply habitats for plants and animals as well as providing space for educational purposes.

Selected development measures for Forest Ecosystem Services

- *Creation and maintenance of mixed and structurally diverse forests: Establishing and maintaining forests with a mix of tree species, ages, and sizes. Practices like continuous-cover forestry ensure a steady supply of biomass while creating varied habitats that support more species than single-age monocultures.*
- *Retaining Critical Habitat Features: During biomass harvesting, intentionally leaving behind key structures essential for wildlife. This includes retaining standing dead trees, downed logs, and a certain number of large, old living trees to serve as shelter, nesting sites, and food sources.*
- *Evaluating Potential for Protection Zones and Buffer Areas: This involves strategically evaluating suitable areas that could be managed with reduced or no harvesting, focusing particulary on sensitive zones like wetlands, steep slopes, or areas with endangered species. Maintaining vegetation buffer zones around streams and rivers protects water quality and aquatic habitats.*
- *Implementing Sustainable Managemnt Practices: Utilizing harvesting techniques that minimize environmental impacts. This includes thinning overstocked stands to improve forest health and reduce wildfire risk, which provides biomass while improving conditions for remaining trees and ground-level habitats.*

Selected business model development

*The selected business model in the Living Lab Waakirchen is the **"Grune Initiative" (Green Initiative)**, which will be founded by forest owner L.B.. It is conceived as a mission-driven, community-based organization (potentially a registered association - "eingetragener Verein") in cooperation with local clubs and the municipality.*

The initiative is built on two core pillars:

1. ***Nature Education:** Offering professional, curriculum-aligned nature-pedagogical tours and workshops in the forest, explicitly incorporating the principles of Education for Sustainable Development (ESD – Bildung fur Nachhaltige Entwicklung). Target groups include schools, kindergartens, families, and tourists. The focus is on creating a tangible connection to the forest ecosystem and promoting understanding of sustainable forest management.*
2. ***Public Relations & Advocacy ("Lobbying for the Forest"):** Acting as a voice for the forest and its owners. This pillar aims to raise awareness among the public and local policymakers about the forest's multifunctionality and its ecosystem services (carbon sink, water reservoir, biodiversity hotspot, place of recreation) and the challenges forest owners face (climate change, economic pressure).*

The unique value proposition lies in the authenticity of the "forest owner's perspective" and the strong local network.

Business model: "Grune Initiative"

The main factors to be considered in this business model are briefly introduced in the paragraphes below.

• Existing market framework

1. ***High Societal Demand:*** *There is a strong and growing public interest in nature, sustainability, and climate change. This creates a high demand for authentic environmental education and nature experiences. The increasing trend of "local recreation" (Naherholung), boosted by the Covid 19 pandemic, further strengthens this, particularly in the area south of Munich.*
2. ***Educational Mandate:*** *Educational institutions (schools, kindergartens) are increasingly looking for external partners to provide hands-on environmental education ("Umweltbildung") as part of their curricula (e.g., the "Lernort Natur" concept in Bavaria)* ***and Education for Sustainable Development (ESD – Bildung fur Nachhaltige Entwicklung)****.*
3. ***Political Support:*** *Environmental education and the promotion of biodiversity are politically desired goals. Municipalities are often interested in supporting such initiatives as they enhance the quality of life and attractiveness of the region for both residents and tourists.*
4. ***Legal Framework (Germany/Bavaria):*** *The general right of public access to forests for recreation (Art. 141 Bavarian Constitution; § 14 Federal Forest Act) provides the legal basis for conducting tours. However, for commercial or organized activities, coordination with authorities and adherence to liability regulations (e.g., professional liability insurance, guide certifications) are essential.*
5. ***Non-Profit Status:*** *If structured as a registered non-profit association ("gemeinnutziger Verein"), the initiative can access specific funding and is eligible for tax-deductible donations, which significantly alters its financial framework compared to a purely commercial enterprise.*

• Competition

1. ***Direct Competitors:***
    - ***State Forestry Enterprises (e.g., Bayerische Staatsforsten):*** *Often have their own well-established forest education programs and visitor centers.*
    - ***Environmental NGOs (e.g., BUND Naturschutz, LBV):*** *Also offer guided tours and educational programs, often run by volunteers.*
    - ***Other Certified Nature Guides:*** *Freelance guides operating in the same region, sometimes with a similar thematic focus.*
2. ***Indirect Competitors:***
    - *Any other leisure activity competing for the time of families and tourists (e.g., swimming pools, museums, mountain cable cars).*
    - *Digital nature content (documentaries) that competes for educational attention.*
3. ***Key Differentiator / Unique Selling Proposition (USP):***

- ***Authenticity:*** *The tours could be partially led by the forest owner himself, offering a credible, first-hand perspective that no other provider can match.*
- ***Local Integration:*** *The partnership with local clubs and the municipality creates a strong community foundation and local network, which makes this initiative unique for this region.*
- ***Dual Mission:*** *The combination of paid educational services and non-profit advocacy work creates a unique, mission-driven brand that can attract both customers and supporters.*

• Potential subsidies

1. ***EU Rural Development Funds (LEADER):*** *This model is a perfect fit for a LEADER project. It is innovative, community-driven, and strengthens the rural area. Funding could cover initial investments (e.g., for materials, website, guide training) and start-up costs.*
2. ***Environmental and Nature Conservation Funds:***
   - *Grants from environmental foundations (e.g., Deutsche Bundesstiftung Umwelt - DBU, local foundations).*
   - *Specific state-level programs for environmental education ("Fdrderprogramme fur Umweltbildung", "Bildung für nachhaltige Entwicklung").*
3. ***Municipal and Local Funding:***
   - *Direct financial support from the partner municipality in exchange for a certain number of free tours for local schools.*
   - *Support from the local tourism board for developing a new visitor offering.*
4. ***Sponsorships & Donations:*** *As a non-profit, the initiative can actively seek sponsorships from local businesses (banks, shops) and solicit tax-deductible donations from individuals to support its advocacy work. The concrete legal form of the 'Grune Initiative' is still being determined, balancing the benefits of non-profit status with the potential of other forms.*
5. ***Project-based Funding:*** *Applying for grants for specific projects, e.g., "Creating a forest nature trail" or "A year with the forester for school classes".*

• Potential revenues

Revenue streams are diversified and stem from both pillars of the initiative:

1. ***From Nature Education (Direct Income):***
   - ***Fees for Guided Tours:*** *A tiered pricing system: e.g., €X per student for school classes, €Y per family for public tours, and higher rates for exclusive private or corporate group bookings (e.g., team events).*
   - ***Fees for Workshops:*** *Charging for specialized, longer workshops (e.g. "Wildlife Tracking", "Building an Insect Hotel").*
   - ***Service Agreements:*** *A fixed annual fee from the municipality, tourism board or specific schools for providing a guaranteed number of educational units per year. Also a share of tourism tax could be used as revenue for offering an additional tourist attraction.*

2. ***From the Association/Advocacy Structure (Sustaining Income):***
    - ***Membership Fees:*** *Regular income from individuals, families, and supporting clubs who become members of the "Grune Initiative" association.*
    - ***Donations:*** *One-time or recurring donations specifically to support the non-profit advocacy and public relations work. These are not payment for a service but support for the cause.*
3. ***Additional Sales (Minor Income):***
    - *Small-scale sales of related products like simple guidebooks, postcards with forest motifs, or certified local wood products. This is more for brand-building than significant revenue.*

Expression of Interest

As a private forest owner, I wish to express my interest in implementing the proposed key measures to enhance and protect the ecological value of my woodland while fostering public awareness of forest ecosystem services.

My preliminary time plan envisions a phased approach, beginning with a preparatory stage for strategically delineating suitable areas for guided tours and events, while also identifying ecologically sensitive zones that should remain undisturbed, and designing educational materials, followed by a implementation phase focused on habitat restoration, creation of learning trails, and installation of interpretive signage.

Draft milestones may include defining concret areas of activity and undisturbed areas , launch of public engagement workshops, and establishment of an ongoing monitoring program.

The development strategy centers on forming partnerships with local schools, conservation groups, and municipal authorities to create a "Forest Learning Hub" that offers guided tours, citizen science projects, and seasonal events. This initiative aims to inspire community stewardship, positioning the property as a model for sustainable private forest management.

Living Lab Waakirchen

Objectives for FES maintenance and development in the Living Labs

The ecological objectives according to the feasibility assessment (O2.3) are centered on the establishment and maintenance of healthy, resilient forest ecosystems that can provide a multitude of benefits. The foundational goal is the creation of stable, mixed, and multi-layered permanent forests ("Dauerwélder"). This approach is seen as the key to achieving further ecological targets. By cultivating structurally rich stands with diverse, site-adapted tree species of varying ages, the forest owners aim to ensure a long-term, sustainable supply of wood biomass while ensuring that harvesting rates do not exceed natural growth. This management style inherently enhances the forest's resilience to climate change impacts such as storms, drought, and pest outbreaks.

Beyond wood biomass production, the forest in the Living Lab is partly managed to support further ecosystem services. For outdoor recreation, the forest is managed to offer high-quality recreation opportunities, balancing tourism with nature conservation through well-maintained trails and visitor guidance.

Another objective is to provide rich habitats for wild plants and animals by retaining habitat trees, enriching deadwood, promoting very old "Methuselah" trees, and maintaining structural diversity, including open clearings and species-rich forest edges.

Concerning the provision of drinking water, near-natural forest soils are maintained to act as effective filtration and storage systems, ensuring a supply of clean drinking water. To support the maintenance of soils, riparian buffer zones around springs should be protected and careful harvesting techniques should be applied to prevent pollution.

Regarding the protection against natural hazards the aim is to protect people, infrastructure, and property by promoting sustainable forest structures. Forest management enhances protection against natural hazards by establishing and sustaining climate-resilient, storm- and drought-tolerant stands.

Furthermore, an ecological goal is to support the forest's role in climate regulation. The promotion of permanent mixed stands with extended rotation periods is designed to maximize the carbon sequestration and storage capacity of the living biomass.

The economic objectives are designed to create new value chains that financially support the ecological goals. A central challenge identified is that forest owners bear the costs of providing numerous public ecosystem services without receiving direct or indirect payment for these services. The primary economic objective is therefore the internalization of positive externalities, which means finding ways to monetize these services. Therefore the goal is to develop business models where customers pay not just for a product such as timber, but also for the "added value" that results from sustainable forest management, meaning ecosystem services such as clean water or carbon storage.

To achieve such payments, a key strategy is the diversification of revenue sources. By establishing business models that are independent of timber sales, the forest operation can minimize its financial risk from volatile timber prices, pest infestations, or storm damage.

For any new business idea to be successful, it must be financially viable. Therefore, another objective is to maximize the contribution margin of these new ventures. After covering their own costs, these new services should generate a positive profit that can be used to co-finance other essential forestry tasks, such as maintaining young stands, avoiding soil compression or reducing timber extraction. Finally, these innovative models are intended to increase the long-term company and "brand" value. By positioning the operation as a modern, forward-looking provider of multiple ecosystem services, the owners aim to enhance their public image and reputation. This positive branding can, in turn, have a beneficial impact on traditional timber sales and make the business more attractive to future employees and partners, increasing its overall value.

In the Living Lab 2 Waakirchen the objective is to foster environmental and sustainability education (as a cultural service) by using stable-mixed forests as natural school for education purposes. Concerning economic objectives, it is the goal to keep and generate indirect income (e. g. via VNP and FNR-subsidies), which finances the additional efforts of the forest owner to supply habitats for plants and animals as well as providing space for educational purposes.

Selected development measures for Forest Ecosystem Services

- *Creation and maintenance of mixed and structurally diverse forests: Establishing and maintaining forests with a mix of tree species, ages, and sizes. Practices like continuous-cover forestry ensure a steady supply of biomass while creating varied habitats that support more species than single-age monocultures.*
- *Retaining Critical Habitat Features: During biomass harvesting, intentionally leaving behind key structures essential for wildlife. This includes retaining standing dead trees, downed logs, and a certain number of large, old living trees to serve as shelter, nesting sites, and food sources.*
- *Evaluating Potential for Protection Zones and Buffer Areas: This involves strategically evaluating suitable areas that could be managed with reduced or no harvesting, focusing particulary on sensitive zones like wetlands, steep slopes, or areas with endangered species. Maintaining vegetation buffer zones around streams and rivers protects water quality and aquatic habitats.*
- *Implementing Sustainable Managemnt Practices: Utilizing harvesting techniques that minimize environmental impacts. This includes thinning overstocked stands to improve forest health and reduce wildfire risk, which provides biomass while improving conditions for remaining trees and ground-level habitats.*

Selected business model development

*The selected business model in the Living Lab 2 is the **"Grune Initiative" (Green Initiative)**, which will be founded by forest owner L.B. It is conceived as a mission-driven, community-based organization (potentially a registered association - "eingetragener Verein") in cooperation with local clubs and the municipality.*

The initiative is built on two core pillars:

3. ***Nature Education:** Offering professional, curriculum-aligned nature-pedagogical tours and workshops in the forest, explicitly incorporating the principles of Education for Sustainable Development (ESD – Bildung fur Nachhaltige Entwicklung). Target groups include schools, kindergartens, families, and tourists. The focus is on creating a tangible connection to the forest ecosystem and promoting understanding of sustainable forest management.*
4. ***Public Relations & Advocacy ("Lobbying for the Forest"):** Acting as a voice for the forest and its owners. This pillar aims to raise awareness among the public and local policymakers about the forest's multifunctionality and its ecosystem services (carbon sink, water reservoir, biodiversity hotspot, place of recreation) and the challenges forest owners face (climate change, economic pressure).*

The unique value proposition lies in the authenticity of the "forest owner's perspective" and the strong local network.

Business model: "Grune Initiative"

The main factors to be considered in this business model are briefly introduced in the paragraphs below.

Existing market framework

6. ***High Societal Demand:** There is a strong and growing public interest in nature, sustainability, and climate change. This creates a high demand for authentic environmental education and nature experiences. The increasing trend of "local recreation" (Naherholung), boosted by the Covid 19 pandemic, further strengthens this, particularly in the area south of Munich.*

7. ***Educational Mandate:*** *Educational institutions (schools, kindergartens) are increasingly looking for external partners to provide hands-on environmental education ("Umweltbildung") as part of their curricula (e.g., the "Lernort Natur" concept in Bavaria)* ***and Education for Sustainable Development (ESD – Bildung fur Nachhaltige Entwicklung)****.*

8. ***Political Support:*** *Environmental education and the promotion of biodiversity are politically desired goals. Municipalities are often interested in supporting such initiatives as they enhance the quality of life and attractiveness of the region for both residents and tourists.*

9. ***Legal Framework (Germany/Bavaria):*** *The general right of public access to forests for recreation (Art. 141 Bavarian Constitution; § 14 Federal Forest Act) provides the legal basis for conducting tours. However, for commercial or organized activities, coordination with authorities and adherence to liability regulations (e.g., professional liability insurance, guide certifications) are essential.*

10. ***Non-Profit Status:*** *If structured as a registered non-profit association ("gemeinnutziger Verein"), the initiative can access specific funding and is eligible for tax-deductible donations, which significantly alters its financial framework compared to a purely commercial enterprise.*

Competition

4. ***Direct Competitors:***
    - ***State Forestry Enterprises (e.g., Bayerische Staatsforsten):*** *Often have their own well-established forest education programs and visitor centers.*
    - ***Environmental NGOs (e.g., BUND Naturschutz, LBV):*** *Also offer guided tours and educational programs, often run by volunteers.*
    - ***Other Certified Nature Guides:*** *Freelance guides operating in the same region, sometimes with a similar thematic focus.*
5. ***Indirect Competitors:***
    - *Any other leisure activity competing for the time of families and tourists (e.g., swimming pools, museums, mountain cable cars).*
    - *Digital nature content (documentaries) that competes for educational attention.*
6. ***Key Differentiator / Unique Selling Proposition (USP):***
    - ***Authenticity:*** *The tours could be partially led by the forest owner himself, offering a credible, first-hand perspective that no other provider can match.*
    - ***Local Integration:*** *The partnership with local clubs and the municipality creates a strong community foundation and local network, which makes this initiative unique for this region.*
    - ***Dual Mission:*** *The combination of paid educational services and non-profit advocacy work creates a unique, mission-driven brand that can attract both customers and supporters.*

Potential subsidies

6. ***EU Rural Development Funds (LEADER):*** *This model is a perfect fit for a LEADER project. It is innovative, community-driven, and strengthens the rural area. Funding could cover initial investments (e.g., for materials, website, guide training) and start-up costs.*

7. ***Environmental and Nature Conservation Funds:***
    - *Grants from environmental foundations (e.g., Deutsche Bundesstiftung Umwelt - DBU, local foundations).*
    - *Specific state-level programs for environmental education ("Fdrderprogramme fur Umweltbildung", "Bildung für nachhaltige Entwicklung").*
8. ***Municipal and Local Funding:***
    - *Direct financial support from the partner municipality in exchange for a certain number of free tours for local schools.*
    - *Support from the local tourism board for developing a new visitor offering.*
9. ***Sponsorships & Donations:*** *As a non-profit, the initiative can actively seek sponsorships from local businesses (banks, shops) and solicit tax-deductible donations from individuals to support its advocacy work. The concrete legal form of the 'Grune Initiative' is still being determined, balancing the benefits of non-profit status with the potential of other forms.*
10. ***Project-based Funding:*** *Applying for grants for specific projects, e.g., "Creating a forest nature trail" or "A year with the forester for school classes".*

Potential revenues

Revenue streams are diversified and stem from both pillars of the initiative:

4. ***From Nature Education (Direct Income):***
    - ***Fees for Guided Tours:*** *A tiered pricing system: e.g., €X per student for school classes, €Y per family for public tours, and higher rates for exclusive private or corporate group bookings (e.g., team events).*
    - ***Fees for Workshops:*** *Charging for specialized, longer workshops (e.g. "Wildlife Tracking", "Building an Insect Hotel").*
    - ***Service Agreements:*** *A fixed annual fee from the municipality, tourism board or specific schools for providing a guaranteed number of educational units per year. Also a share of tourism tax could be used as revenue for offering an additional tourist attraction.*
5. ***From the Association/Advocacy Structure (Sustaining Income):***
    - ***Membership Fees:*** *Regular income from individuals, families, and supporting clubs who become members of the "Grune Initiative" association.*
    - ***Donations:*** *One-time or recurring donations specifically to support the non-profit advocacy and public relations work. These are not payment for a service but support for the cause.*
6. ***Additional Sales (Minor Income):***
    - *Small-scale sales of related products like simple guidebooks, postcards with forest motifs, or certified local wood products. This is more for brand-building than significant revenue.*

Expression of Interest

As a private forest owner, I wish to express my interest in implementing the proposed key measures to enhance and protect the ecological value of my woodland while fostering public awareness of forest ecosystem services.

My preliminary time plan envisions a phased approach, beginning with a preparatory stage for strategically delineating suitable areas for guided tours and events, while also identifying ecologically sensitive zones that should remain undisturbed, and designing educational materials, followed by a implementation phase focused on habitat restoration, creation of learning trails, and installation of interpretive signage.

Draft milestones may include defining concret areas of activity and undisturbed areas , launch of public engagement workshops, and establishment of an ongoing monitoring program.

The development strategy centers on forming partnerships with local schools, conservation groups, and municipal authorities to create a "Forest Learning Hub" that offers guided tours, citizen science projects, and seasonal events. This initiative aims to inspire community stewardship, positioning the property as a model for sustainable private forest management.

LIVING LAB ITALY

Valle Tanaro

Output 2.4

Living Lab Italy

Living Lab introduction

Overview and Strategic Role

The Valle Tanaro Living Lab represents the Italian pilot area of the Forest EcoValue project, aimed at testing innovative models for the valorisation of forest ecosystem services (FES) through integrated public–private governance and circular value chains. It acts as an open platform for experimentation, knowledge exchange and stakeholder cooperation, combining ecological, economic and social objectives. The Living Lab focuses on developing a multifunctional forest economy that links sustainable management with local wellbeing, fostering innovation, biodiversity conservation and climate resilience in mountain landscapes.

Geographical and Environmental Context

Located in the southern part of the Piemonte Region (Province of Cuneo), the Valle Tanaro extends from the upper valley slopes of Ormea and Garessio down to the hilly areas of Ceva and Priero (see Figure 2). Altitudes range from approximately 350 m to over 2,000 m a.s.l., encompassing a transition between Alpine and Mediterranean environments. Forests dominate the landscape, covering about 60 % of the total area and alternating with pastures, chestnut groves and small agricultural plots. The territory hosts a mosaic of forest types—beech, chestnut, oak, mixed broadleaves and conifers—many included in Natura 2000 sites and regional parks. These ecosystems deliver key services such as carbon sequestration, biodiversity maintenance, water regulation and recreational opportunities.

Figure 2: *Location of the Valle Tanaro in the southern part of the Piemonte Region, Source: …*

Socio-economic and Land Use Features

The Living Lab area is characterised by a dispersed settlement pattern and a long history of forest use, today intertwined with rural tourism, beekeeping, small-scale agriculture and energy production from local biomass. The economy remains fragile, constrained by depopulation, ageing ownership and limited market access. However, the coexistence of traditional knowledge and new entrepreneurial initiatives—cooperatives, small processing firms, community projects—offers potential for sustainable diversification. The cultural landscape, shaped by centuries of agroforestry, is a key resource for slow tourism and territorial branding.

Forest Ownership and Management Structures

Forest ownership in the Valle Tanaro is highly fragmented: about 16 % public, 3 % private under active management, and more than 75 % small or undetected private properties. Public forests, mainly municipal, are often subject to civic use rights and managed through collective schemes. The Monte Armetta Forest Consortium coordinates the management of over 1,100 ha of public and private forests in Ormea, promoting uniform silvicultural practices. In parallel, Associazioni Fondiarie (ASFO) aggregate smallholders to counteract fragmentation and enable joint forest planning. This network forms the institutional backbone for sustainable land stewardship.

Governance and Stakeholder Network

The Living Lab relies on a diverse governance ecosystem including municipalities and their unions, forest consortia, ASFOs, SMEs, cooperatives, and NGOs such as the Gruppo Micologico Cebano. The Forestry School of Ormea acts as a hub for education and innovation in forest management. Through participatory processes, these actors co-design actions for forest restoration, ecosystem credit schemes and green value chains. The Living Lab thus serves as a territorial interface between research, policy and practice, fostering cooperation and shared responsibility in the transition toward climate- and biodiversity-smart forestry.

Objectives for FES maintenance

Objectives identified in the regional feasibility study (O2.3)

The Regional Feasibility Assessment for the Valle Tanaro Living Lab identified a set of ecological, economic and social objectives aimed at strengthening the multifunctional role of local forests. The primary goal is to enhance the provision of forest ecosystem services (FES) — including carbon sequestration, biodiversity conservation, soil and water regulation, and cultural values — while supporting sustainable rural livelihoods.

Ecological objectives focus on the adoption of climate- and biodiversity-smart forest management, favouring mixed and uneven-aged structures, the conversion of ageing coppices to high forests, and the restoration of abandoned chestnut orchards. These interventions are designed to increase carbon storage, improve habitat quality and maintain the resilience of forest ecosystems against climate change and extreme events.

Economic objectives aim to revitalise local value chains by diversifying income sources from timber, non-wood forest products (mushrooms, honey, chestnuts), and nature-based tourism. A central feature is the creation of integrated business models linking forest management with market mechanisms for ecosystem services, including carbon and biodiversity credits. This approach seeks to reduce the financial gap between management costs and market revenues, promoting fair compensation for forest owners and managers.

Social and governance objectives address land fragmentation and ownership dispersion, encouraging cooperation among smallholders through Associazioni Fondiarie (ASFOs), forest consortia and community cooperatives. Strengthening local capacity, training, and collective planning are considered essential to ensure continuity in management, improve operational efficiency and reinforce the territorial identity linked to forest heritage.

Priority setting of objectives for the road map

Based on the feasibility results and stakeholder consultations, the roadmap prioritises actions according to their ecological urgency, economic feasibility and governance impact.

1. ***Active and climate-smart forest management –*** *Implement interventions with measurable benefits on carbon and biodiversity, promoting close-to-nature silviculture and certified sustainable forestry.*
2. ***Restoration and enhancement of traditional chestnut systems*** *– Combine ecological restoration with the recovery of productive and cultural functions, reinforcing links with tourism and gastronomy.*
3. ***Strengthening collective governance and land aggregation*** *– Support ASFOs, consortia and cooperatives as key tools to overcome fragmentation and coordinate management at the landscape scale.*
4. ***Development of integrated value chains and green markets –*** *Stimulate the creation of circular, bio-based and tourism-linked economies, combining tangible and intangible forest values.*
5. ***Activation of blended finance mechanisms*** *– Promote public–private partnerships and payments for ecosystem services (PES) to ensure long-term economic sustainability.*
6. ***Capacity building and innovation*** *– Encourage training, knowledge transfer and participatory processes involving schools, research institutions and local actors. Together, these priorities define a coherent pathway to transform the Valle Tanaro into a resilient and competitive forest territory, capable of generating ecological, economic and social value from its natural capital.*

Selected development measures for Forest Ecoystem Services

The development measures selected for the Valle Tanaro Roadmap derive from the feasibility analysis (O2.3) and from the participatory discussions held with local stakeholders. They aim to integrate ecological restoration, economic diversification, and social innovation into a single territorial strategy. The selected measures combine forest management actions with the creation of enabling conditions for the valorisation of ecosystem services.

1. Climate- and biodiversity-smart silviculture

The conversion of ageing beech coppices into high forests and the adoption of mixed, uneven-aged silvicultural systems are prioritised to enhance structural diversity and long-term stability. Selective thinning and regeneration cuts are designed to increase carbon sequestration capacity, promote native species diversity, and reduce vulnerability to droughts and pests. These interventions are expected to deliver measurable benefits in terms of carbon storage, biodiversity conservation and soil protection, while maintaining sustainable timber production.

2. Restoration of chestnut orchards and mixed forest mosaics

Traditional chestnut orchards are key ecological and cultural assets of the Valle Tanaro. Their restoration through pruning, cleaning and periodic maintenance improves landscape quality, strengthens habitat functions, and supports pollinators and associated biodiversity. Revitalised orchards can also re-enter local economies through chestnut, honey and mushroom production, linking cultural heritage with new market opportunities and tourism.

3. Enhancement of non-wood forest products (NWFPs)

The sustainable harvesting and promotion of mushrooms, honey and other NWFPs contribute to income diversification and territorial branding. Training programmes for collectors, certification of sustainable practices, and integration with gastronomy and tourism are foreseen. These measures enhance provisioning services and support a circular economy that reinvests part of the revenue into forest maintenance.

4. Development of forest-based tourism and recreation

The creation of thematic trails and guided experiences connects visitors with the ecological and cultural value of forests. Revenue-sharing mechanisms will ensure that part of tourism income supports forest restoration and maintenance. These initiatives strengthen cultural and recreational ecosystem services while promoting community participation and awareness of forest stewardship.

5. Strengthening of collective governance mechanisms

Consolidating Associazioni Fondiarie (ASFOs), forest consortia and local cooperatives is fundamental to achieve economies of scale and coordinate interventions. Support actions include legal assistance, technical facilitation and the creation of territorial pacts among owners, enterprises and public bodies. Collective management increases efficiency, ensures compliance with sustainable standards and facilitates access to funding for FES-oriented forestry.

6. Activation of financial and policy instruments for FES monetization

Blended finance models combining public co-financing, private sponsorships and voluntary carbon and biodiversity credit schemes are essential to close the economic gap between costs and returns. The design of Payment for Ecosystem Services (PES) instruments and certification systems will enable measurable, transparent valorisation of environmental outcomes, providing stable income streams for forest managers.

Together, these measures are expected to increase the overall supply of ecosystem services in the Valle Tanaro—enhancing carbon storage, biodiversity, water regulation and cultural values—while creating sustainable economic opportunities and strengthening local resilience.

Selected business model development

The business model developed for the Valle Tanaro Living Lab is based on the integration of sustainable forest management, value chain diversification and ecosystem service monetisation. Designed through a participatory process, it combines ecological restoration with local economic development, aiming to make climate- and biodiversity-smart forestry financially viable. The model is structured around ***two complementary pillars****:*

- ***Land stewardship and ecosystem service valorisation**, where targeted forest interventions generate measurable environmental outcomes (carbon sequestration, biodiversity enhancement, landscape quality) certified and monetised through voluntary markets or sponsorships;*
- ***Development of value-added forest-based products and services**, including timber, non-wood forest products (mushrooms, honey, chestnuts) and experiential tourism, whose revenues directly support forest management activities.*

The model functions as a circular system where part of the profits from product sales and tourism experiences is reinvested into restoration, certification and monitoring. It promotes cooperation among municipalities, Associazioni Fondiarie (ASFOs), forest consortia, community cooperatives and private companies, creating a territorial alliance for forest stewardship.

Business model

Existing market framework

The Valle Tanaro hosts a variety of forest-related markets that form the foundation for the integrated model. Timber production, particularly chestnut and beech, supports regional industries such as Silvateam S.p.A., which uses local biomass (chestnut) for tannin extraction and other green chemistry applications. Non-wood forest products—especially mushrooms and honey—have a consolidated local culture and are increasingly connected to gastronomy and tourism. The district also benefits from existing initiatives in biomass energy (e.g., the Ormea district heating network) and emerging opportunities in nature-based tourism and educational experiences. The model leverages these existing assets to develop a more cohesive and resilient forest economy.

Competition

The main competitive challenges stem from high operational costs in mountain areas, fragmented supply chains and the limited scale of production. Imported biomass and low-priced foreign timber often undercut local products, while traditional chestnut and honey markets remain marginal without added value. Voluntary carbon and biodiversity credit markets are promising but still immature, with price volatility and regulatory uncertainty. The model's competitiveness therefore depends on product differentiation—such as "climate-smart timber" or certified NWFPs—and the integration of ecosystem service credits into diversified market offers.

Potential subsidies

*Economic viability requires blended financing combining **public incentives and private contributions**. Eligible instruments include rural development funds (CSR 2023–2027), regional PES schemes, climate and biodiversity payment programmes, and sponsorships from companies pursuing carbon neutrality. Performance-based subsidies or premiums for "climate-smart" wood and certified ecosystem services are considered essential to balance costs and revenues. Co-financing from philanthropic foundations and innovation grants may further support pilot initiatives and certification processes.*

Potential revenues

*At full operational maturity, the integrated model is expected to generate approximately **€600,000 per year** across all value chains. Revenues derive from:*

- *sales of certified timber and biomass;*

- *production and marketing of mushrooms, honey and chestnut-based goods;*
- *nature-based and educational tourism packages;*
- *monetisation of carbon and biodiversity credits through voluntary markets and sponsorships. These income streams, complemented by public and private co-financing, ensure economic sustainability and reinforce the link between forest management and territorial development. The model thus transforms the Valle Tanaro's forest capital into a driver of ecological regeneration and inclusive green growth.*

Expression of interest

The participatory process carried out in the Valle Tanaro Living Lab has fostered the involvement of a diverse network of stakeholders who could potentially adhere to the integrated business model. While no formal agreements have yet been established, multiple actors have expressed interest in principle and identified possible roles they could play in future implementation.

Potentially involved stakeholders include:

- ***ASFOs and the Forest Consortia** – Provision of intervention areas, joint forest management, and project design.*
- ***Regione Piemonte** – Key institutional stakeholder and project observer, providing strategic alignment with regional forest, climate and sustainable development policies, and supporting the institutional anchoring and long-term scalability of the roadmap.*
- ***Municipalities** – Support for governance, access to public funding, and integration into local development strategies.*
- ***Local agricultural enterprises –** Collection, transformation, and marketing of forest and agricultural products.*
- ***Community cooperatives** – Chestnut orchard maintenance and provision of tourism-related services.*
- ***Monitoring and marketing entities** – Oversight of certification, promotion, and market development.*
- ***Supporters** – Private companies, banking foundations, and associations willing to sponsor or co-finance activities.*
- ***Gruppo Micologico Cebano** – Potential role as tourism promoter, provider of mycological training, and aggregator of multiple stakeholders engaged in mushroom-related value chains.*
- ***Scuola Forestale di Ormea** – Implementation of training yards and pilot projects for students and professionals, reinforcing regional expertise in climate- and biodiversity-smart silviculture.*
- ***Tourism operators and NGOs** - Design and delivery of experiential tourism packages, promotion of NWFPs, awareness-raising on ecosystem services.*

This network—if formalised through territorial pacts, forest agreements, or multi-stakeholder consortia—could provide a solid foundation for coordinated implementation, combining technical skills, land access, and promotional capacity to deliver the Living Lab's objectives.

At the conclusion of the Living Lab activities, several stakeholders formally expressed their interest in contributing to the continuation and scaling of the roadmap. The organisations that submitted an Expression of Interest include the, ***Regione Piemonte (Regional Sectors for Forests and for Sustainable Development and***

***Climate Change), Gruppo Micologico Cebano**, the **Municipality of Ormea**, **Finpiemonte S.p.A.**, the **community cooperative La Volpe e il Mirtillo**, **Walden S.r.l.**, **ASFO Pamparà**, the **Consorzio Forestale Monte Armetta**, and the **Scuola Forestale di Ormea**.*

These entities represent the full spectrum of territorial governance — from public authorities and research institutions to forest managers, private enterprises and civil society — confirming a broad and cohesive commitment to the integrated forest management model developed within the Valle Tanaro Living Lab. Their engagement provides a strong foundation for future collaboration, pilot implementation and long-term institutional anchoring of the roadmap's objectives.

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Alpine Space

Forest EcoValue

Manifestazione di interesse- Progetto Forest EcoValue

Si conferma la presa visione deU'analisl di fattibilità e della proposta di piano d'azione *(roadmap)* del **Living Lab della Valle Tanaro,** elaborate nell'ambito del progetto **Forest EcoValue -Alpine Space,** e dei relativi principi, intenti e obiettivi strategici.

In linea con le strategie e gU indirizzi regionali in ambito forestale e di sviluppo sostenibile, si riconosce il valore delle azioni proposte per promuovere una gestione forestale associata sostenibile, multifunzionale e orientata al mantenimento e miglioramento dei servizi ecosistemici.

Si espcime pertanto l'interesse dell'ente Regione Piemonte a contribuire a promuovere, nei limiti delle proprie competenze e possibilità, le attività di implementazione, sviluppo e monitoraggio proposte dal progetto Forest EcoValue, in coerenza con quanto definito nell'analisi di fattibilità e nella roadmap del Living Lab Valle Tanaro.

Luogo e data, Tocino 19/11/2025

Dott. Edoardo Guerrini

Dirigente responsabile del Sett Sviluppo sostenibìle e cambiamenti climatici deUa Regione Piemonte

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lng. Enrico Gallo

Dirigente responsabile del Sett Foreste della Regione Piemonte

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LIVING LAB SLOVENIA

Tržič

Output 2.4

Living Lab Slovenia

Living Lab introduction

The Municipality of Tržič covers an area of 15,500 hectares and has a population of 15,090. Of these, around 3,000 residents live in the town of Tržič, while the majority of the population is concentrated in the southern part of the municipality. The area features a diverse geological and pedological structure and is characterized by highly varied terrain. The northern part, encompassing the Karawanks mountain range, is alpine and predominantly composed of carbonate rocks. It extends above the forest line, reaching its highest point at 2,133 meters (Košutnikov turn). The central part of the municipality consists of hilly terrain with more complex geology, while the southern part is characterized by flat river–glacial terraces. The municipality is rich in watercourses, many of which have a torrential character. The largest streams are the Tržiška Bistrica, Mošenik, and Lomščica, which flow through the valleys of Podljubelj, Jelendol and Dolžanova soteska, and Lom. Forests cover about 73% of the municipal area and have traditionally been an important source of income for local residents. Although there are around 2,000 (co-)owners of forest land, a considerable number of them hold properties larger than 30 hectares or even 100 hectares. The map in Figure 3 represents the distribution and location of state forests and communal forests. Therefore, forest management can represent a significant source of employment within farms. Beyond timber production, forests provide numerous additional benefits – forest ecosystem services (FES). Forests purify the air, offer a variety of forest products, and serve as spaces for relaxation and recreation. Forests protect against the harmful effects of floods, erosion, falling rocks, and landslides; they help cool the atmosphere and mitigate climate change. These benefits are enjoyed not only by forest owners but also by other residents and visitors of Tržič.

Due to its advantageous location in the heart of the Karawanks and its relative proximity to larger urban centres, Tržič possesses significant natural conditions and considerable potential for (business) development based on these resources. Within the European project Forest EcoValue, the project team at the Slovenia Forest Service (SFS) focused on three key FES: the use of wood biomass for heating, the protective role of forests against the damaging effects of torrential waters, and recreation and tourism. The municipality map in Figure 4 shows the location of existing infrastructures and the torrents.

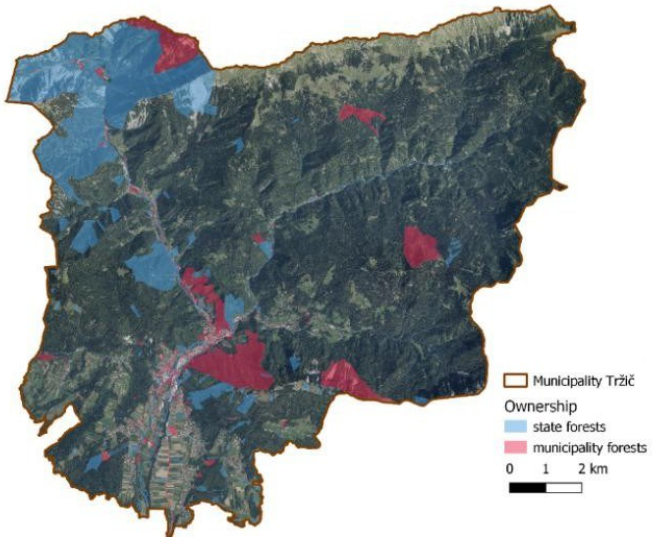


Figure 3: *Municipality of Tržič with forests owned by state and municipality.*

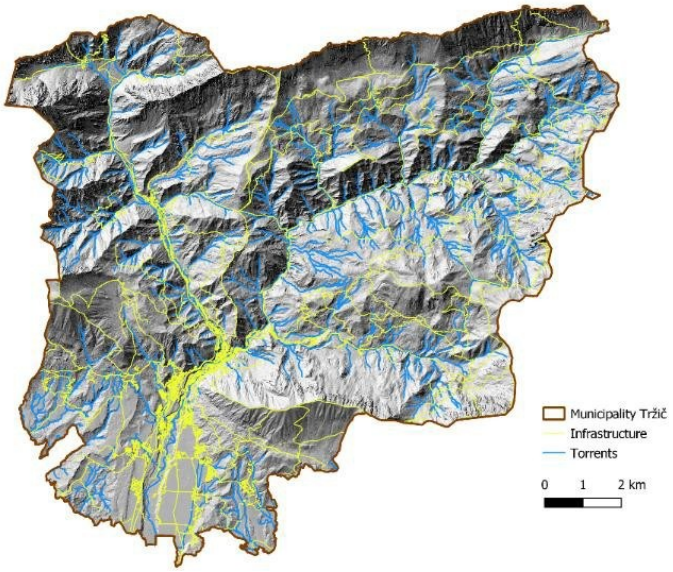


Figure 4: *Torrents and Infrastructure in the Tržič municipality.*

Objectives for FES maintenance

Wood biomass

In the Municipality of Tržič, forests are the dominant landscape element and, in addition to their extensive coverage, represent one of the main natural resources. Compared to the national average in Slovenia, forest properties in Tržič are relatively large, with several owners possessing properties exceeding 30 hectares. Forest owners are generally quite active in practicing forest management. The forest stands provide both high-quality timber and lower-quality wood suitable for energy use.

Energy production from renewable sources in the municipality is, due to its geographical position and relief characteristics, primarily limited to the utilization of water (small hydropower plants for electricity generation) and wood (biomass for heat production). Biomass therefore represents a significant potential and may, in the future, contribute to an increased share of renewable energy sources within the municipality. The use of biomass can provide additional income for forest owners and encourage more active forest management, which is also essential for ensuring other benefits to the local community, such as more resilient forests, protection of roads, buildings, and residents from various natural hazards, carbon sequestration, and other FES. The objectives are summarized in Table 3.

Table 3: *Objectives for FES Wood biomass in Slovenian LL.*

Main objective: Promoting the use of wood biomass in the municipality		
Objective	***Description***	***Importance****
Objective 1	*Encouraging active management of private forests – climate change resilience*	*4,75*
Objective 2	*Ensure a continuous supply of biomass from local forest owners as a renewable energy source*	*4,5*

Objective 3	*Integrate the use of biomass and biomass district heating systems (BDHS) into the municipality's strategic development plans*	*4,25*
Objective 4	*Promote active management of private forests to achieve higher-quality timber*	*4*
Objective 5	*Identify the potential for harvesting low-quality wood*	*3,75*
Objective 6	*Create opportunities for additional income for forest owners*	*3,75*
Objective 7	*Establish a market for low-quality wood*	*3,75*
Objective 8	*Raise awareness about the opportunities and advantages of biomass and BDHS*	*3,75*
Objective 9	*Promote active management of private forests to increase the biomass production*	*3*

**1 – insignificant; 5 – crucial (this is an assessment of the importance of each individual objective, which is the average of the assessments given by the members of the project team)*

Torrents

The area of the municipality of Tržič is a distinctly torrential area. In the past, numerous torrential floods have endangered the population and caused damage to buildings and infrastructure. With the impacts of climate change—manifesting in more frequent and intense extreme weather events—the risks of torrential flooding are increasing. Future climate scenarios indicate worsening conditions and, consequently, a higher level of risk for an increasing number of people directly affected by these hazards. When torrential events occur, we often deal with the consequences that are visible downstream of the torrential streams, while overlooking what is happening in hinterland. These upper parts, predominantly forested parts of the municipality where torrents originate and are most powerful, play a crucial role in understanding and mitigating these processes.

Key factors contributing to the comprehensive management of torrential areas and the reduction of flood impacts include the state of forests, appropriate forest management, the condition of water management infrastructure, and the maintenance of forest infrastructure (roads) that enable effective forest management and access for sanitary works when necessary. Various stakeholders—at the national, regional, and local levels (including municipalities and forest owner associations), as well as individuals (forest owners and residents) - can contribute to these efforts. In recent decades, this aspect has been largely neglected by professionals, the state, and local communities. In a municipality such as Tržič, however, it represents one of the main priorities for ensuring the safety and well-being of residents, as well as the conditions for sustainable forest management. The objectives are summarized in Table 4.

***Table 4:** Objectives for FES Torrents control in Slovenian LL.*

Main objective: Developing a system for torrent management		
Objective	***Description***	***Importance****
Objective 1	*Propose improvements to forest management practices in torrential areas to reduce flood risk*	*5*
Objective 2	*Analyze stakeholders involved in torrent management and assess their respective responsibilities*	*4,75*
Objective 3	*Establish cooperation and information exchange between the water management and forestry sectors.*	*4,5*
Objective 4	*Evaluate personnel and financial needs for torrent inspections within the SFS*	*4,5*
Objective 5	*Develop a methodology for conducting torrent inspections in forested areas*	*4,25*

Objective 6	*Test the proposed methodology in a pilot area – the Municipality of Tržič*	*4*
Objective 7	*Assess the strengths and weaknesses of the current forest management system in torrential areas.*	*3,75*

**1 – insignificant; 5 – crucial (this is an assessment of the importance of each individual objective, which is the average of the assessments given by the members of the project team)*

Recreation and tourism

All objectives are summarized in Table xx. The pilot area of the Municipality of Tržič is part of a broader mountainous and forested landscape. In recent years, the importance of such areas has significantly increased, reflected in growing visitor numbers and the expanding range of outdoor activities. Within the municipality, certain areas are particularly popular due to their natural appeal, proximity to urban centers, and relatively good accessibility. Increased visitation brings both advantages and conflicts. These are most evident in the disregard for traffic regulations or insufficient parking facilities, as well as in disagreements between different forms of recreation. The area of Tržič is also important from other aspects, such as timber production, the protective effects of forests, nature conservation (habitats for animals, plants, fungi, etc.), gathering forest products, hunting, etc. Recreational activities may, however, lead to conflicts with other forest uses.

At the same time, recreation represents an opportunity for the local community: visitors can generate income for local residents, enhance the municipality's visibility, and support its sustainable development practices by promoting recreation activities. Properly managed recreation can strengthen both the role of forests and public awareness of forest etiquette. Conditions for visitation need to be well set (entry points, trails), while unauthorized activities—such as the use of motor vehicles in natural areas—must be appropriately regulated. A well-maintend area is more attractive to visitors (including tourists) and also gives a sense of presence. There is a greater respect for forest etiquette, and higher respect for rules of behaviour in natural environments. The management of recreational use also requires targeted financial resources. The objectives are summarized in Table 5.

***Table 5:** Objectives for FES Recreation in Slovenian LL.*

Main objective: Promoting sustainable recreation in forest areas		
Objective	***Description***	***Importance****
Objective 1	*Contribute to reducing conflicts related to recreational activities in forest areas*	*5*
Objective 2	*Prepare and propose a set of measures and recommendations for managing conflicts associated with recreation*	*5*
Objective 3	*Identify potential payment schemes for FES to support sustainable recreation in forests*	*4,75*
Objective 4	*Strengthen cooperation among stakeholders involved in recreational forest use*	*3,75*
Objective 5	*Assess visitors' knowledge obout the rules on the use forests*	*3,5*
Objective 6	*Analyze visitation characteristics and identify the most visited areas within the pilot area – the municipality of Tržič.*	*3,25*
Objective 7	*Evaluate potential economic benefits for the local population*	*3,25*
Objective 8	*Assess the state of the art regarding visits to the mountainous forest area in the municipality of Tržič*	*3*

**1 – insignificant; 5 – crucial (this is an assessment of the importance of each individual objective, which is the average of the assessments given by the members of the project team)*

Selected development measures for Forest Ecoystem Services

Wood biomass

Biomass potential analysis

Based on SFS data, we assessed the biomass potential in the municipality. We analysed the planned allowable cut, defined in forest management plans, representing the maximum volume of timber allowed for harvesting. Actual harvested quantities are typically. We also analysed the ownership structure. Detailed assessments of wood biomass potential were carried out using the WISDOM model (Woodfuel Integrated Supply/Demand Overview Mapping model), a tool for visualizing biomass potential, demand, and supply.

Biomass demand analysis

Using municipal documents—including strategic plans and the Local energy concept containing data on existing district heating systems—and a review of local businesses, we estimated the approximate biomass demand within the municipality. Given that Tržič currently lacks major municipal BDHS, yet possesses significant potential due to its ownership structure and settlement pattern, we focused subsequent project activities on exploring this development direction.

Review of legislation, literature, best practices from other municipalities, and conferences

Slovenia aligns with the objectives of the Green Transition, and as a result, national legislation includes numerous incentives for renewable energy use as well as guidelines limiting the use of non-renewable energy sources, also at the municipal level. We examined potential (co-)funding opportunities and financial incentives. Additionally, we analysed how BDHS have been established in other, similarly sized municipalities, reviewing options for financing, management models, and biomass supply chains. In Slovenia, BDHS are predominantly municipally owned, though management often involves private biomass companies. Cooperative systems or partnerships among individuals for establishing larger BDHS are relatively rare.

Cooperation with the Municipality

The municipality is a key stakeholder in any potential establishment of a BDHS, and we maintained active collaboration throughout the project. Several meetings were organized, during which we worked alongside the Local Energy Agency of Gorenjska to support the preparation of the Local energy concept. We presented the municipality the benefits of using wood biomass, examples of best practices from other municipalities, possible (co-)financing, approximate setup costs, system design and operational models, and biomass supply options. Project activities and survey results among large forest owners were also presented. As the municipality itself is one of the larger forest owners, we provided recommendations for managing its own forest.

Analysis of forest owners' willingness to supply biomass

Although harvesting levels are defined in forest management plans, forest owners are not required to implement them except in some exceptional cases. Actual harvesting depends on owners' motivation and objectives, which are influenced by socioeconomic conditions and wood market dynamics. We were interested under what circumstances owners would decide to harvest and sell low-quality wood. With assistance from the Tržič local unit of the SFS, we compiled a list of major forest owners (those with properties exceeding 10 ha, n = 129). A survey was designed to assess their interest in selling low-quality wood if purchase on local level was organized, the quantities

they would be willing to supply, how they currently use the wood, and which factors could motivate them to engage in sales. The results indicate that larger owners are interested in selling lower-quality timber.

Awareness-raising activities

We prepared two articles for the local newspaper Tržičan: the first provided a general overview of biomass under the title "Exploring opportunities for Increased use of wood biomass in Tržič", and the second presented the main results of the survey among major forest owners under the title "Use of low-quality wood among forest owners in the Municipality of Tržič."

Interviews with biomass companies

Two biomass-related companies operate in and around the municipality. We conducted an interview with one of them, Gaj les d.o.o., to gain insight into its activities within Tržič, its cooperation with forest owners of different sizes, examples of successful collaboration, and prospects for expanding its operations.

Education, networking, and stakeholder engagement

We organized a workshop that brought together key stakeholders in the biomass sector, including representatives of SFS involved in biomass-related areas and local foresters, municipal representatives, large forest owners, the Local Energy Agency of Gorenjska, biomass companies, representatives of Slovenski državni gozdovi d.o.o. ("Slovenian State Forests", a company that managed state forests), the Forest Owners' Association, and a best-practice representative from Komunala Kočevje (utility company, part of Municipality Kočevje, responsible for BSHS in Kočevje). Participants were introduced to the biomass situation and activities in Tržič. The mayor presented the municipality's perspective on biomass use, while Marin Radovčič presented the establishment and operation of the BDHS in Kočevje as an example of good practice. The workshop included a "world café" session, where participants proposed ideas for increasing biomass use in the municipality. The event also served as a platform for stakeholder networking, exchanging opinions, formulating proposals, and defining shared objectives (s. Figure 5).

KEY FUTURE ACTIVITIES*:

- *Presentation of results on the potential use of wood biomass at the session of the Regional Committee for Rural Development of Gorenjska*
- *Presentation of key messages and business models for wood biomass at the final conference of the Forest EcoValue project to stakeholders and residents of the Municipality of Tržič, as well as to the broader Gorenjska region*
- *Activities aimed at integrating the SFS into energy policies and committees to enable more detailed wood biomass potential*
- *Continued cooperation with the local community of the Municipality of Tržič in further developing the biomass thematic*
- *Promotion of wood biomass use by encouraging forest owners for regular and active forest management*
- *Strengthening awareness among forest owners, the local community, residents, and other stakeholders about the potential use of biomass through articles, publications, and other outreach activities*

**Some of those activities will be carried out by the end of Forest EcoValue project, while some are proposals for future work in this field.*

Figure 5: *Networking sessions regarding the use of wood biomass for heating.*

Torrents

Analysis of the current state of torrent management in Slovenia

The analysis was conducted through several activities. We reviewed forestry and water management legislation, as well as the current treatment of torrential areas within forest management plans. Examples of good practice in torrent regulation and slope stabilization were examined and visited in the Municipality of Železniki (SFS local unit Železniki). Internal meetings and workshops were organized, bringing together representatives from various institutions involved in forestry and torrent management, including the SFS, the Slovenian Forestry Institute, the Department of Forestry at the Biotechnical Faculty, d.o.o., Slovenian State forests d.o.o, the Upper Sava concessionaire Hidrotehnik d.o.o., and the company Rejda d.o.o., which specializes in green infrastructure solutions for torrent control.

Employee training

In cooperation with the Department for Torrent and Avalanche Control of the Austrian Federal Ministry of Agriculture, Forestry, Regions and Water Management, employees were introduced to Austria's approach to torrent inspection. The training began with an online lecture covering theoretical and legislative foundations of torrent management and inspection in Austria, followed in spring by a three-day practical training course in Carinthia, Austria. During the field course, participants learned in detail about the organizational structure and methodology for torrent inventory and monitoring, both in theory and in practice. Representatives from France also attended. The training provided an opportunity for exchanging experiences related to forest management and torrent area administration between countries. In addition to gaining new technical knowledge, networking and institutional cooperation were an important part of this activity.

Development of a torrent inventory and monitoring system in the Municipality of Tržič

Building on the newly acquired expertise and experience, we collaborated with domestic experts in torrent surveying to design a methodology adapted to Slovenian conditions and challenges, specifically for headwater areas. The methodology was then tested in the Municipality of Tržič. The purpose of the torrent inspection was to assess the state of the forests around torrents and condition of torrents in order to identify forest management measures in critical torrent areas to improve flood safety. The survey also aimed to evaluate the state of existing water management infrastructure in upper parts of torrents and determine the need for interventions in problematic sections.

The development of the system consisted of several steps:

Torrent analysis and identification of problematic torrents

We collected multiple datasets, including the layer of watercourses from the Slovenian Water Agency, flood vulnerability and hazard maps, existing torrent records from the municipal spatial plans for Tržič, forest function maps, the hazard maps for landslides (scale 1:25,000), and records of past damage events from forestry archives. Based on these data and field experience of foresters from the Tržič unit, we assessed the degree of torrent criticality, potential threats to infrastructure, and inspection feasibility and safety.

Preparation of torrent Inventory forms

Before designing the inventory forms, a field training session was conducted with torrent experts Aleš Klabus and Dr. Milan Kobal. They demonstrated survey methods previously applied in post-disaster assessments in Slovene Carinthia and suggested improvements for further development. Based on literature reviews and knowledge from Slovenia and abroad, we created a field form and a digital application for torrent inventory. Several torrents were surveyed during test runs, and the form and app were refined multiple times. Data collected included erosion and sedimentation processes, driftwood accumulation, water management infrastructure, and road crossings. Each record also included proposed management measures, the priorities for implementing them and feasibility, photographs, notes, and timestamps.

Preparation of guidelines and QField application

We developed written guidelines for torrent inventory and designed a corresponding application in QField. The app and procedures were presented to staff, installed on mobile devices, and tested collaboratively.

Testing the methodology in the Municipality of Tržič

In close cooperation with foresters from the Tržič Regional Unit, the project team surveyed most of the identified problematic torrents in the municipality.

Preliminary assessment of personnel and cost requirements within SFS

Based on torrent characteristics and field work, we estimated the approximate staff and financial resources needed by SFS for torrent inspection activities in the case of the Municipality of Tržič.

Assessment of flood and erosion damage in the municipality and Slovenia

Since one of the project's objectives was to assess economic importance of FES, we analysed flood- and erosion-related damages in Tržič and Slovenia as a whole for comparison with the costs of preventive forest management measures—such as thinning to enhance stand stability, erosion control (biotechnical measures for bank and slope stability, retaining structures, planting, and young stand tending).

Identification of challenges in torrent management within the forestry sector

A stakeholder workshop was organized with representatives from SFS, Slovenian Forestry Institute, Biotechnical Faculty, Slovenian State Forests d.o.o., Hidrotehnik d.o.o., and the Ministry of Agriculture, Forestry, and Food to identify the main problems and challenges in torrent management in Slovenia. Participants also proposed improvements for the management of torrential areas within the forestry sector (s. Figure 6).

Collaboration with various institutions

Through joint meetings, workshops, trainings, and conferences, we established connections and cooperated with numerous institutions, including Slovenian Forestry Institute, Biotechnical Faculty, Slovenian State Forests, Ministry of Agriculture, Forestry, and Food, Hidrotehnik d.o.o, Rejda d.o.o, the Geological Survey of Slovenia, Department for Torrent and Avalanche Control, and the Municipality of Tržič.

Public and professional awareness-raising

We conducted outreach to both the general and forestry public about our activities. Information was shared on the SFS website, its Facebook page, and the EUSALP LinkedIn group. Articles were published in Slovene forestry journal Gozdarski vestnik: "Workshop on forest management in torrential areas in Jelendol" and "Training on torrent area management in forested landscape". Educational videos were prepared for schools on the protective functions of forests. We also presented the paper "Reducing flood risks in mountain regions through forest management: a case study from the Municipality of Tržič, Slovenia" at an international conference in Innsbruck. We also presented our work on the final conference, "Professional bases and guidelines for forest management in torrential areas," and at the 35th session of the FAO Working Party on the Management of Mountain Watersheds.

KEY FUTURE ACTIVITIES*:

Prepare a proposal for the final torrent inventory system, including cost estimates, required personnel, and proposed organizational adjustments within SFS to enable systematic torrent supervision
Implement dissemination activities to ensure stable staffing and sustainable financing of SFS
Define guidelines and measures for forest management in torrential areas and integrate them into SFS planning systems, silvicultural practices, and forest infrastructure planning
Present key findings and potential payment schemes at the final Forest EcoValue project conference to stakeholders and residents of the Municipality of Tržič and the wider Gorenjska region
Organize additional forestry and interdisciplinary workshops to further develop the field of torrent and forest management
Cooperate with local communities (the Municipality of Tržič and others) to further develop the field of torrent and forest management
Strengthen awareness among local communities and forest owners about the importance of proper management of torrential areas through articles, media contributions, and other outreach activities
Provide training for SFS employees and forest owners on adaptive forest management practices in torrential areas
Involve experts in the process of updating relevant legislation in the field
Develop a system for permanent and stable financing of appropriate flood-prevention measures in torrential areas—including forestry measures, adaptive forest infrastructure planning, and the construction or restoration of water management infrastructure
Promote cooperation among all key national, local, and professional institutions and organizations involved in torrent management
Establish an integrated torrent monitoring system supported by a Geographic Information System
Encourage interdisciplinary training—foresters learning about water management, and water managers learning about forestry

**Some of those activities will be carried out by the end of Forest EcoValue project, while some are proposals for future work in this field.*

***Figure 6**: Impressions from the surveyed torrents.*

Recreation and tourism

Analysis of visitation in the Municipality of Tržič

Existing data were collected on visits to natural areas in the municipality, including tourist arrivals and overnight stays, trends in parking lot usage, guided tours, and mountain rescue interventions.

Analysis of visitation characteristics and opinions of visitors on recreational activities

A survey was conducted among forest visitors in the Municipality of Tržič to analyse visitation patterns and attitudes toward recreational activities in forest areas. Data were collected using an online questionnaire available via the 1KA platform. The survey was promoted across several online portals (e.g., MojaObčina, the Municipality of Tržič website, the Alpine Association of Slovenia, Geolista, etc.) and on social media. Additionally, the survey was advertised through QR codes placed at various locations, including parking areas near trailheads and mountain huts (e.g., Zelenica, Dobrča, Kriška gora). The survey was open between September 2024 and February 2025, during which 415 responses were collected. The results of the survey

significantly contributed to a better understanding of the spatial and thematic characteristics of forest visitation and served as a valuable basis for developing effective measures to balance different interests.

Education, Networking, and Stakeholder Dialogue

A stakeholder workshop was organized to bring together key actors involved in managing activities in mountain forest areas (s. Figure 7). Participants included representatives of the SFS responsible for recreation-related issues (such as monitoring), regional, local and district foresters from SFS, representatives of special-purpose hunting grounds, municipal authorities, major forest owners, Slovenian State Forests d.o.o., the Forest Owners Association, representatives of the Triglav National Park, the Institute of the Republic of Slovenia for Nature Conservation, various NGOs, mountaineering, tourism, and cycling associations, as well as mountain rescue services. At the workshop, participants were presented with the current situation, key activities, and survey results regarding forest visitation in Tržič. They then jointly identified key challenges and issues related to recreational use of forest areas and proposed sustainable visitation management measures, distinguishing between different parts of the municipality. The workshop also served as a platform for stakeholder networking, exchange of views, and the formulation of joint objectives and recommendations.

Cooperation with the Municipality

Throughout the implementation of activities, close cooperation was maintained with the Municipality of Tržič, which supported the dissemination of the online survey through the municipal website and other communication channels, assisted in organizing events, obtaining visitation data, and sharing project results in local media. The municipality was regularly informed about key project activities and developments.

Raising awareness among the general and professional public

Project activities related to recreation were actively communicated to various target audiences. Information was published on the SFS website, SFS Facebook page, and the EUSALP LinkedIn group. Educational video materials for schools were prepared, focusing on recreation and the social functions of forests. In addition, an article was published in the regional newspaper Gorenjski Glas.

The project team also presented the paper "The Importance of mountain forest areas for outdoor recreation – the case of the Municipality of Tržič" at an international conference in Innsbruck, contributing to the exchange of knowledge and best practices at the international level.

KEY FUTURE ACTIVITIES*:
Presentation of key messages and business models for sustainable recreation at the final Forest EcoValue project conference to stakeholders and residents of Tržič and the wider Gorenjska region
Preparation of a proposal for controlling activities in mountain forest areas
Preparation of possible solutions for visitor access, including parking facilities and public transport options, in cooperation with the local community
Planning of visitor access and transport solutions – organisation of parking, public transport options, and sustainable access in collaboration with the municipality
Continued collaboration with the Municipality of Tržič to further develop this thematic area
Promotion of sustainable recreation and tourism in forests through schemes or incentives for forest owners to adapt forest management practices in areas with increased visitation

Development of support mechanisms and incentives for local residents to generate additional income from tourism and recreational activities
Preparation of technical and professional bases for guiding recreational use in mountain forest areas, in cooperation with experts, local authorities, and competent institutions
Raising awareness among visitors, forest owners, the local community, residents, and other stakeholders about the importance of sustainable recreation in forests

**Some of those activities will be carried out by the end of Forest EcoValue project, while some are proposals for future work in this field*

***Figure 7**: Impressions from the stakeholder workshop.*

Selected business model development

Business model for wood biomass

BDHS are becoming increasingly common due to the use of renewable and local energy sources—primarily wood biomass—and related incentives. In the Municipality of Tržič, no large-scale municipal BDHS currently exist, although the municipality has extensive forest cover, favourable settlement patterns, and a suitable ownership structure for such systems. Strategic municipal documents, including the Local Energy Concept, already reference renewable energy sources and BDHS. Decisions regarding BDHS implementation are typically gradual and based on municipal strategies related to energy self-sufficiency and the green transition. The establishment of a BDHS would create a new market for lower-quality wood in the municipality, offering potential additional income for forest owners, farmers managing overgrown areas, and companies involved in biomass production and supply. Biomass procurement can be organized either by the municipality or by specialized companies. Agreements with forest owners usually take the form of one- or multi-year contracts, defining prices based on quantity and quality, with possible adjustments for inflation. Greater flexibility from the buyer—allowing smaller delivery volumes or flexible delivery schedules—can attract a wider range of forest owners. Beyond economic benefits (additional income for owners and companies, lower heating costs), BDHS systems increase local energy self-sufficiency, reduce carbon footprints, and promote a circular economy.

Existing Market Framework

The Municipality of Tržič is well-suited for biomass use, with significant forest coverage and a favourable ownership structure. Lower-quality wood is traditionally used for heating, with part sold in Slovenia and Austria. Most surveyed forest owners estimate that 20–40% of their harvest is lower-quality wood, while a

third report less than 20%, indicating a current focus on harvesting high-quality timber. For energy purposes, owners typically use about 27% of harvested wood, roughly half for personal use and half for sale. Surveyed owners generally report no difficulties in finding buyers. Prices for energy wood vary by quality, supply conditions, and global market trends. For example, beech firewood costs approximately €90/m³, while pulpwood is around €50/m³. Many owners harvest less than the allowable volume, completing about 70% of the planned harvest. A local market with stable demand for lower-quality wood could encourage more active forest management and increase forest-derived income.

Currently, there are no major consumers of lower-quality wood in the municipality, such as large wood-processing companies or municipal BDHS systems. Several small enterprises operate in logging, harvesting, and transport. Two large nearby companies also provide biomass grinding and supply services.

Competition

Biomass is freely sold on the market. For forest owners, it is advantageous to have multiple buyers and to sell locally, reducing transport costs. Survey results indicate that owners value both competitive pricing and simple, organized logistics. Owners would be motivated if the buyer organized the supply chain (felling, harvesting, transport). Quick payment and the ability to deliver smaller quantities are also important. Well-organized procurement logistics are a critical component of a successful BDHS. Best practices from other municipalities show that procurement can be handled by a company or the municipality, with collaboration providing multiple economic and social benefits to the local community.

Potential Subsidies

Biomass use as a renewable energy source is promoted by EU and national policies, e.g., subsidies for stoves and BDHS and penalties for fossil fuel use. There are no specific subsidies tied directly to biomass harvesting in forests, although support exists for clearing afforested agricultural areas.

Potential Revenue

Establishing a BDHS in Tržič to purchase biomass from local owners would offer several advantages. Proximity to the market reduces transport costs. Increased interest among forest owners could foster cooperation, reducing labor costs and achieving better prices. For owners of larger properties or those already engaged in harvesting, this could provide an additional revenue stream. A local market for low-quality wood could also incentivize active forest management, leading to more silvicultural work, higher-quality timber production, and resilient forests capable of adapting to climate change. Additional benefits include reducing energy import dependence, increasing local energy self-sufficiency, supporting the circular economy, and generally lowering heating costs for public buildings and private consumers.

Payment scheme for torrent management

Our business model is not typical; it is more of a payment scheme. Payment schemes linked to FES provide financial incentives to forest owners and managers to deliver not only timber but also other essential FES. These benefits are achieved through forest protection measures, silvicultural practices, restoration activities, watercourse bank stabilization measures, and higher standards of sustainable forest management, which indirectly increase forest resilience. In the context of managing torrential areas, the state and local communities contribute to public benefits—primarily enhancing the safety of people and their property from the harmful effects of torrential floods—by supporting comprehensive management of these areas. Torrent management encompasses several components, including establishing a monitoring system and service that connects key stakeholders, implementing stabilization and restoration measures, promoting resilient and vital forests within torrentential areas, and conducting specific interventions for slope and bank stabilization.

Existing Market Framework

Downstream watercourses are managed by the water sector, which typically does not operate in the predominantly forested upstream catchments. In these forested headwaters, sustainable, close to nature, and multifunctional forest management reduces the impact of damaging torrential floods. In areas with significant protective forest functions, management is adapted, and subsidies are available for silvicultural activities, such as planting, tending, and initial thinning. In the past, torrent management in Slovenia was organized by specialized company combining forestry and hydrology expertise. Funds were also allocated for the implementation of flood protection measures. In recent years, most funding has focused on post-event remediation/recovery/reconstruction rather than preventive measures. In the field of forest management, funds are also available for the above-mentioned silvicultural works in torrential areas. However, due to the relatively low estimated labour costs (hourly rates), the implementation of these activities is lower than planned. Special funds are also available for protective forests, which can be used for torrent control measures (e.g. for the construction of check dams). Since the implementation of such works is extremely demanding and there a lack of established practice for their planning and implementation, these activities are generally not planned in most parts of Slovenia. While the Slovenian Water Agency operates and plans interventions downstream, there is no dedicated service for torrent monitoring or for defining necessary forestry interventions in upstream forested areas. Communication between the forestry and water sectors is limited.

Competition

Within torrent management systems, competition primarily arises between institutions over jurisdiction, influence, and funding. Clear roles and responsibilities are often undefined, so "competition" is largely institutional rather than market-based.

Potential Subsidies

In areas critical for flood protection, active and targeted interventions by forest owners and managers are essential. Dedicated subsidies are needed to support higher-standard forest management, including bank stabilization measures (planting, tending young trees, biotechnical measures), watercourse maintenance, and construction and maintenance of forest roads, which are crucial both for regular management and sanitary works, and for access to hinterland areas. These interventions provide public benefits to communities living downstream. In the Municipality of Tržič, upper torrent reaches are currently unmanaged with technical measures, making such interventions critical for enhancing safety. The funds are available for the higher-standard forest management in torrential areas in the field of forest management. However, due to the relatively low estimated labour costs (hourly rates), the implementation of these activities is lower than planned. Special funds are also available for protective forests, which can be used for torrent control measures (e.g. for the construction of check dams). Since the implementation of such works is extremely demanding and there is a lack of established practice for their planning and implementation, these activities are generally not planned in most parts of Slovenia.Incentives for implementation may be financial or non-financial, such as assistance with execution of these demanding works or full implementation by a responsible authority. Additionally, funding is required for a dedicated service responsible for forest monitoring in torrential areas. During the project, we estimated the need for personnel, work and financial requirements for this service, proposing that it operates within the SFS.

Potential Revenues and Benefits

Revenue streams are diverse and take multiple forms. The primary benefit is enhanced flood protection, which serves the public interest. By properly managing torrential areas, potential damages and sanitary and restoration costs from floods are significantly reduced, relieving the local municipal budget. Thus, relatively small investments yield substantial benefits. Secondary revenue benefits accrue to forest and landowners. Proper management improves forest productivity and income for owners, enables access to mountain farms, and increases agricultural revenues. Enhanced safety and accessibility also contribute to property values, tourism, and recreational opportunities, generating additional income for the local community.

Business model for recreation and tourism

The Municipality of Tržič offers exceptional opportunities for recreation and tourism, providing potential income for the local community and its residents. Multiple business models for recreation are possible. The first is in the form of payment schemes designed to incentivize forest owners to improve conditions for recreational use within their forests. Other business models can generate additional income for landowners, such as through parking fees, sales of local products, and related services. Indirect benefits are also possible: appropriate measures reduce conflicts and enable regular forest management by owners.

Existing Market Framework

Under Slovenia's Forest Act, forests are publicly accessible, meaning anyone can walk through them. Nevertheless, certain restrictions apply to recreational activities. Additional incentives are required for measures that provide public benefits. In areas where the social functions of forests are emphasized, management is adapted, and subsidies are available for silvicultural activities, including planting, tending, , and initial thinning. If a forest is designated by municipal decree as having a special purpose due to highly emphasized social functions, the municipality is obligated to purchase it at the request of the owners. Other forms of compensation are possible but are rarely implemented in practice. Some forest owners sell local products at forest entry points.

Competition

Competition in guiding recreational use may arise from profit-oriented activities on private land—for example, guiding groups through private forests and agricultural land, particularly for activities that are not fully regulated, such as mountain biking.

Potential Subsidies

In areas critical for recreation and the social functions of forests, proper conditions are needed to support these activities. Targeted subsidies are necessary to cover higher-standard forest management, which includes development of recreational infrastructure (hiking and cycling trails, entry points), increased (on-site) information on logging and timber extraction activities, consideration of visitors and spatial and temporal adjustment of harvesting operations. These measures provide public benefits for residents and visitors, so appropriate financial or non-financial incentives are essential (assistance from the municipality and relevant authorities for information, awareness campaigns, monitoring and control, volunteer work, etc.). Some measures can also be implemented through European and national projects.

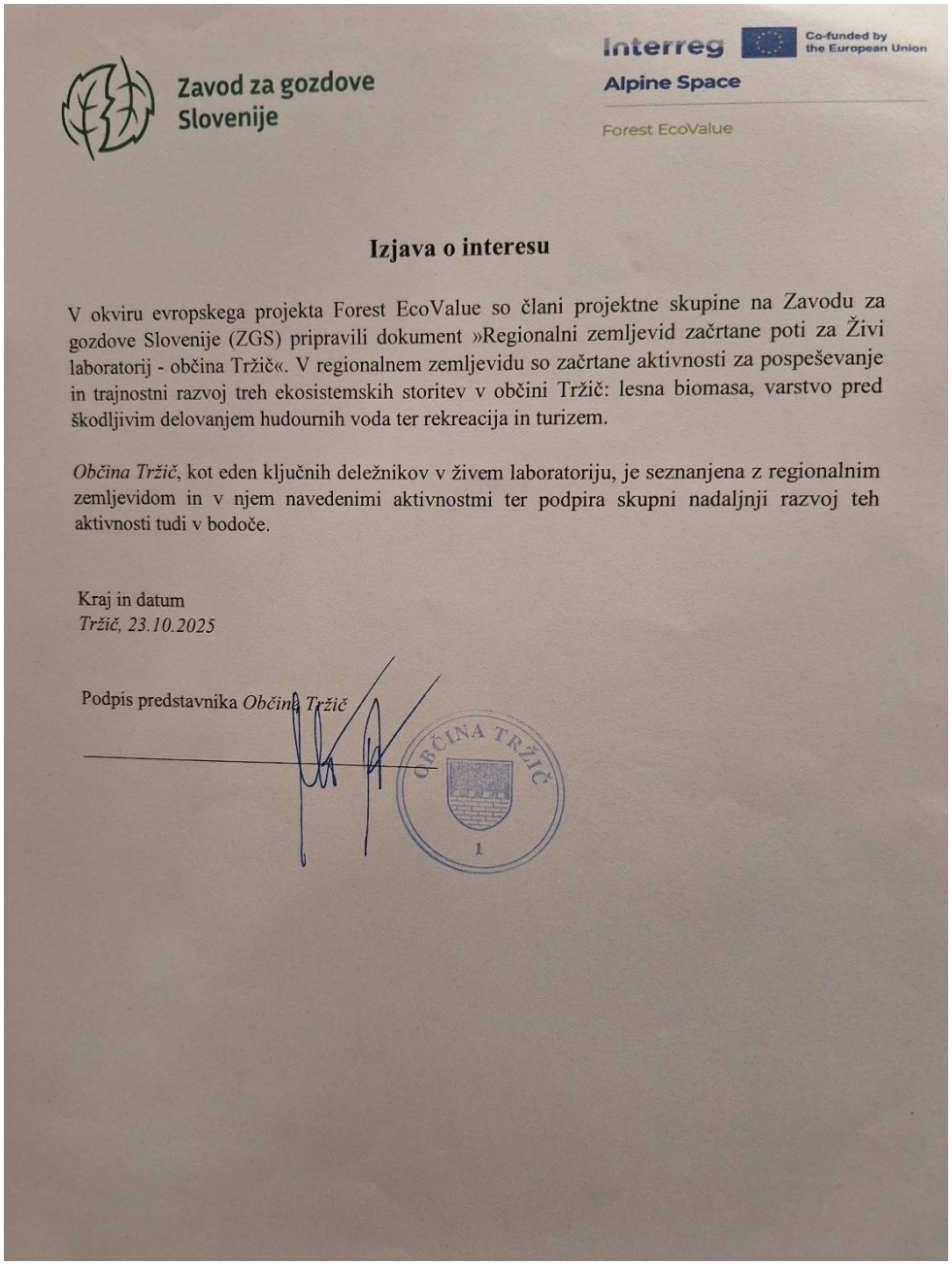
Potential Revenues

Forest owners could earn income by managing recreational infrastructure (e.g., maintaining cycling trails,), though these financial measures are not yet applied in practice. Unregulated mountain biking tours on private forests currently occur, representing an opportunity for additional income for the local community,

which should be appropriately developed. The local community could also gain revenue indirectly through improved visitor conditions, leading to increased overnight stays (tourist taxes), and directly through parking fees and public transport services. A visitor survey indicated that 57% of respondents were willing to pay for public transportation. Specifically, 72% were willing to pay 2–5 €for a round-trip ticket from an organized parking lot in Tržič to the start of a mountain hike (e.g., Kofce, Dolga njiva, Storžič). For parking at a maintained lot, 46% of respondents were willing to pay 2–5 €.

Expression of interest

Figure 8 shows the signed expression of interest and Figure 9 the presentation of the roadmap at the Municipality of Tržič.



Zavod za gozdove Slovenije

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Forest EcoValue

Izjava o interesu

V okviru evropskega projekta Forest EcoValue so člani projektne skupine na Zavodu za gozdove Slovenije (ZGS) pripravili dokument »Regionalni zemljevid začrtane poti za Živi laboratorij - občina Tržič«. V regionalnem zemljevidu so začrtane aktivnosti za pospeševanje in trajnostni razvoj treh ekosistemskih storitev v občini Tržič: lesna biomasa, varstvo pred škodljivim delovanjem hudournih voda ter rekreacija in turizem.

Občina Tržič, kot eden ključnih deležnikov v živem laboratoriju, je seznanjena z regionalnim zemljevidom in v njem navedenimi aktivnostmi ter podpira skupni nadaljnji razvoj teh aktivnosti tudi v bodoče.

Kraj in datum
Tržič, 23.10.2025

Podpis predstavnika *Občina Tržič*

OBČINA TRŽIČ
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Figure 8: *Signed expression of interest.*

Figure 9: *Presentation of the Road Map at the Municipality of Tržič.*

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