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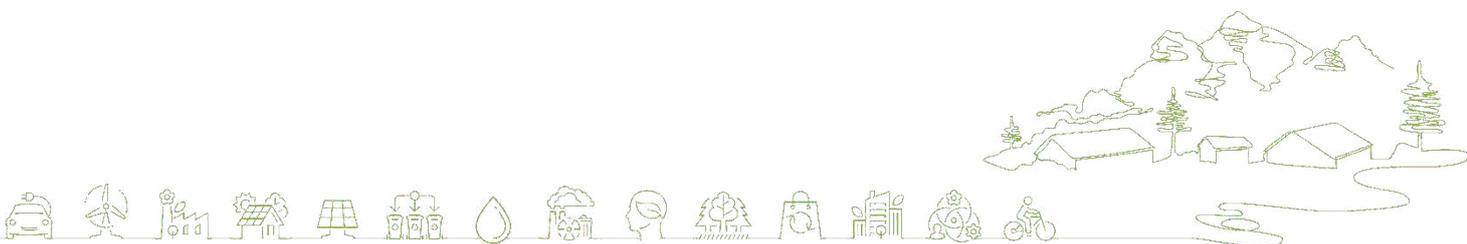
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Forest EcoValue

# TRANSNATIONAL NETWORK OF FIVE LIVING LABS TO SET UP MARKET FRAMEWORKS AND PAYMENT SCHEMES FOR FOREST ECOSYSTEM SERVICES

0.2.1

RESPONSIBLE PARTNER:  
FINPIEMONTE/PP1





Interreg Alpine Space Programme 21-27

Carbon neutral and resource sensitive Alpine region

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**

Project ID: ASP0100005

## List of the Forest EcoValue project partners

- PP1. Finpiemonte SpA – Regional financial and development agency / **Coordinator** [FINPIE] 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 für Umweltplanung und Raumentwicklung GmbH & Co. KG [Ifuplan]
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- PP8. University of Graz, Institute of Environmental Systems Sciences [UNIGRAZ]
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## 1. Introduction: scope and purpose of Output 2.1

Forests of the Alpine Space play a fundamental role in climate change mitigation and adaptation, biodiversity conservation and territorial resilience. They provide a wide range of Forest Ecosystem Services (FES), including carbon sequestration, protection against natural hazards, regulation of water cycles, biodiversity maintenance, recreation and cultural values. At the same time, Alpine forests face increasing pressures related to climate change, land abandonment, fragmentation of ownership and declining economic viability of traditional forest-based value chains.

The costs associated with forest maintenance and management in mountain areas are high, while public funding and conventional timber-oriented markets are often insufficient to ensure the long-term provision of ecosystem services. Although economic valuation and payment schemes for FES are widely discussed in policy and research debates, their concrete application in Alpine regions remains limited and fragmented.

The ForestEcoValue project addresses this challenge by exploring innovative approaches to forest management and maintenance, with the objective of supporting new bio-based value chains and developing market frameworks and payment schemes for selected Forest Ecosystem Services. The project focuses on provisioning, regulating and cultural services, including non-timber forest products and biomass for energy, carbon sequestration and biodiversity conservation, natural risk reduction, recreation, tourism and cultural or spiritual services.

Within this framework, **Output 2.1 – Transnational network of five Living Labs to set up market frameworks and payment schemes for Forest Ecosystem Services** provides an integrated synthesis of the pilot action carried out in Work Package 2. The document introduces the overall logic of the pilot, summarises its main results, and supports navigation across the set of in-depth WP2 deliverables and outputs.

The pilot action builds on **D.1.3.2 – Methodological guidelines and tools to assess Forest Ecosystem Services and develop market frameworks in Alpine communities**, which represents the methodological baseline of the project. D.1.3.2 defines analytical and operational tools for FES assessment, economic valuation and market design. In WP2, this framework was applied and tested transnationally, through a network of five Living Labs operating in different Alpine territories.

Output 2.1 is aimed to provide:

- a narrative framework explaining how the pilot action was implemented;
- a short synthesis of the main processes and findings emerging from the Living Labs;
- a guide to the WP2 outputs where detailed data, tools and analyses can be found.

## 2. 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<sub>2</sub> 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<sub>2</sub> 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. 4 O.2.2: Transnational guidelines and tools for the establishment of public-private markets for the selected FES in alpine communities
- **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 was carried out within the Living Labs. Stakeholders' active involvement in these labs is essential for co-designing and testing models and tools, ensuring that innovative approaches are rooted in local realities. In parallel, public events and capacitybuilding 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: 42 months

### 3. The pilot action framework: testing a common approach

The pilot action implemented in Work Package 2 was designed to test, under real territorial conditions, the methodological framework defined in ***D.1.3.2 – Methodological guidelines and tools to assess Forest Ecosystem Services and develop market frameworks in Alpine communities***. To this end, the project adopted a transnational Living Lab approach as a core implementation framework.

The Living Labs served as **experimentation environments** where selected Forest Ecosystem Services were assessed, valued and linked to potential market frameworks and payment schemes. The services addressed within the pilot covered:

- **provisioning services**, including non-timber forest products and woody biomass integrated into circular energy markets;
- **regulating services**, such as carbon sequestration, biodiversity conservation and natural risk reduction, explored through mechanisms including carbon and biodiversity credits, protective forest management and innovative environmental finance instruments;
- **cultural services**, with a focus on recreation, tourism, health-related experiences and spiritual or cultural values.

The pilot action was implemented through a transnational network of five Living Labs located in different Alpine regions, characterised by diverse ecological conditions, forest types, ownership structures, socio-economic contexts and governance arrangements. This diversity provided the opportunity to apply and test the methodological framework defined in D.1.3.2 under heterogeneous real-world conditions, while maintaining a shared analytical logic across territories. By combining local adaptation with a common methodological baseline, the Living Lab network enabled the assessment of how Forest Ecosystem Services valuation approaches, market frameworks and payment schemes perform in different contexts, supporting meaningful comparison without imposing uniform solutions.

Within this framework, ***O.2.2 – Transnational guidelines and tools for the establishment of public–private markets for the selected Forest Ecosystem Services in Alpine communities*** represents the consolidated outcome of the testing phase, translating the pilot experience into refined and transferable tools.

**Output 2.1** synthesises this experience, providing an overview of how the pilot unfolded across the Living Labs and how local experimentation and transnational comparison jointly contributed to the project's objectives.

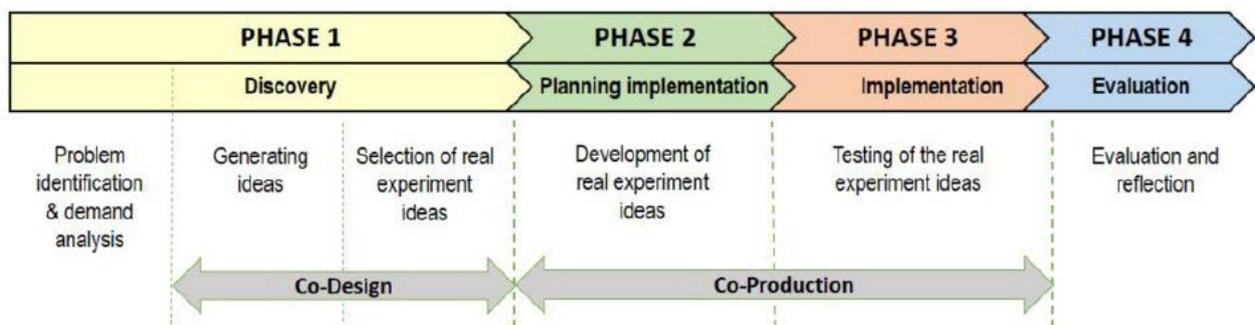
## 4. Living Labs implementation pathways, Forest Ecosystem Services and stakeholder engagement

The pilot action implemented within Work Package 2 was carried out through a transnational network of five Living Labs located in Alpine regions in Austria, France, Germany, Italy and Slovenia. While sharing a common methodological framework based on D.1.3.2, each Living Lab developed a context-specific implementation pathway reflecting local ecological conditions, forest management practices, governance arrangements and stakeholder configurations.

Across all territories, the pilot combined participatory processes, the assessment of selected Forest Ecosystem Services (FES), and the exploration of market frameworks and payment schemes. The following sections describe, for each Living Lab, the territorial context, the FES addressed, the favoured business or implementation models, and the involvement of stakeholder groups.

The implementation of the pilot action across all Living Labs was guided by a shared and structured work plan of the pilot action, which provided a common operational framework for WP2 while allowing for contextual adaptation at local level.

The work plan structured the Living Lab process into four main phases — Discovery, Planning implementation, Implementation and Evaluation — ensuring a harmonised sequence of activities across territories. Within this framework, all Living Labs followed a common logic encompassing stakeholder identification and engagement, selection of a locally relevant subset of Forest Ecosystem Services, biophysical and economic assessment of the selected services, and the exploration of suitable business models and payment schemes.



The work plan established a coherent set of shared tools, templates and guidelines supporting data collection, participatory processes and assessment activities across all phases of the Living Lab process. This common framework ensured transnational comparability and overall coherence of the pilot action, while allowing each Living Lab to adapt implementation pathways to local governance arrangements, forest management practices and stakeholder configurations. An overview of the tools supporting the pilot action is provided in the annexes.

### 4.1 Living Lab Italy – Valle Tanaro (Piedmont)

#### Context

The Italian Living Lab is located in Valle Tanaro, a large mountainous area in the Piedmont region comprising 30 municipalities. The territory is characterised by a strong multifunctional forest context, with close interlinkages between forestry, agriculture, cultural heritage and tourism.

### **Forest Ecosystem Services addressed**

The Living Lab focused on a diversified set of FES, including:

- provisioning services, particularly the valorisation of chestnut groves and other non-timber forest products;
- regulating services related to carbon sequestration, biodiversity conservation and natural hazard protection;
- cultural services linked to experiential activities, forest heritage and rural traditions.

### **Favoured business / implementation model**

The pilot followed an integrated development approach, combining forest management, local value chains and experiential activities. Implementation was gradual and incremental, aligned with existing territorial governance structures and local development strategies.

### **Stakeholder engagement**

Stakeholder engagement in Italy involved approximately 154 identified stakeholders across 9 target groups. Among these, 28 entities were actively engaged in the participatory process through workshops and other dedicated activities.

The most represented target groups included SMEs, Interest groups including NGOs, and Local Public Authorities, with the involvement of key Business Support Organisations and Higher Education and Research Organisations. In addition, two large companies based in the territory provided an active contribution to the local confrontation process. Regione Piemonte (Regional Public Authority) followed the process with interest and ensured the review and validation of the feasibility assessment and roadmap. Among the actively involved stakeholders, 10 were forest owners.

## **4.2 Living Lab France – Haute-Savoie (Grand Annecy and Thonon)**

### **Context**

The French Living Lab operates in a highly attractive and urbanised Alpine context in Haute-Savoie and is structured as a single Living Lab process covering two sub-areas: Grand Annecy and Thonon. Forests in this area are strongly multifunctional and subject to high recreational pressure.

### **Forest Ecosystem Services addressed**

The Living Lab focused primarily on:

- cultural services related to recreation, tourism and experience-based forest use;
- regulating services, with particular attention to water regulation.

### **Favoured business / implementation model**

The pilot explored public–private partnership mechanisms to support forest management measures, particularly in relation to recreation and water-related services. Economic and market-related analyses were oriented towards feasible financing mechanisms connected to tourism and public service provision.

### **Stakeholder engagement**

The participatory process in France involved 20 stakeholder groups, representing approximately 200 individual stakeholders across 9 target groups. Engagement relied mainly on one-to-one meetings, interviews and invitation-only workshops, with a limited use of large public events. Local public authorities and business support organisations played a central role.

The most represented target groups were Interest groups, including NGOs, and Citizens and civil society. Forest owners accounted for around 35% of the contributors.

### 4.3 Living Lab Slovenia – Karavanke Mountains, Municipality of Tržič

#### Context

The Slovenian Living Lab is located in the Karavanke mountain area within the municipality of Tržič and is characterised by very high forest cover and a highly fragmented ownership structure, with more than 2,000 forest owners. A large share of the forests fulfils protective functions and is included in Natura 2000 areas.

#### Forest Ecosystem Services addressed

The Living Lab focused on:

- regulating services related to natural risk management, particularly torrent control and protective forests;
- provisioning services linked to wood biomass supply chains;
- cultural services associated with recreation and sustainable tourism.

#### Favoured business / implementation model

The pilot was embedded within existing forest management and planning frameworks, reflecting the strong coordinating role of the Slovenian Forest Service. Implementation emphasised public coordination and feasibility analyses, particularly for regulating services dominant in mountain forest contexts.

#### Stakeholder engagement

In Slovenia, the participatory process involved 60 identified stakeholders across 8 target groups. Forest owners represented around 60% of the contributors, primarily through their participation in a dedicated survey, which achieved a high response rate. A smaller number of forest owners also took part in the in-person workshops.

### 4.4 Living Lab Austria – Province of Styria

#### Context

The Austrian Living Lab is located in the Province of Styria, a region with around 60% forest cover and a predominantly private and highly fragmented forest ownership structure. Forest owners' associations play a key role in forest management and stakeholder coordination.

#### Forest Ecosystem Services addressed

The Living Lab focused on:

- biodiversity and habitat provision;
- carbon sequestration and storage.

#### Favoured business / implementation model

The pilot tested innovative financing mechanisms, in particular reverse auctions, to incentivise forest owners to adopt biodiversity- and climate-related measures. Economic valuation focused on regulating services and their comparison with provisioning functions, demonstrating the feasibility of market-based instruments designed to reduce transaction costs.

#### Stakeholder engagement

The participatory process in Austria involved more than 160 identified stakeholders across different stages and with varying levels of engagement, representing 15 target groups. Three target groups were at the core of the participatory process: Regional technical bodies on forestry, represented by the Styrian Forest Owners' Association (Waldverband Steiermark); Financial Institutions, represented by Raiffeisen-Landesbank Steiermark; and Private Forest Owners, who constituted the largest share of the contributors.

Sixteen private forest owners were actively engaged throughout the participatory process. In addition, more than 140 private forest owners participated in one or more activities organised as part of the participatory process (such as in-person and online Living Lab workshops, public events, and personal consultations with applicants by phone).

## 4.5 Living Lab Germany – Tegernsee Valley (Upper Bavaria)

### Context

The German Living Lab is located in the Tegernsee Valley in Upper Bavaria and includes several sub-areas characterised by medium-scale forest properties and proximity to large urban centres. Forest ownership includes both private and institutional owners.

### Forest Ecosystem Services addressed

The Living Lab focused primarily on:

- cultural and spiritual services, such as forest cemeteries with biodegradable urns;
- educational and awareness-raising services;
- biodiversity and habitat conservation.

### Favoured business / implementation model

The pilot explored socially oriented business approaches and public–private partnership models, relying on locally embedded initiatives rather than standardised market mechanisms. Implementation was strongly influenced by social acceptance and alignment with legal and planning frameworks.

### Stakeholder engagement

In Germany, the participatory process involved 106 identified stakeholders across 16 target groups. The most represented target groups were Interest groups, including NGOs, in particular forest owners' organisations and actors representing forestry operators and land owners (20%), and Local Public Authorities, notably forest authorities and municipalities (34%).

Forest owners accounted for 19% of the contributors. This share mainly reflects participation through online formats, including 18 forest owners who took part in the online intermediate event held in September 2025. Among them, two forest owners (a private forest owner, L.B., and the Archdiocese of Munich Freising) played a key role as core stakeholders in the whole participatory process.

## 4.6 Cross-cutting patterns across Living Labs

Across the five Living Labs, pilot implementation pathways were characterised by adaptive and iterative processes rather than linear sequences of activities. Despite strong territorial differentiation, common patterns emerged, including the central role of participatory processes, the close interaction between ecological and economic assessment, and the importance of intermediary actors in supporting stakeholder engagement and the operational testing of market frameworks and payment schemes.

Across the Living Labs, stakeholder engagement consistently combined different levels of involvement, ranging from broad outreach and consultation formats to more intensive and continuous participation by a core group of actors. In all territories, public and semi-public institutions played a key enabling role, either by coordinating the process, supporting stakeholder engagement, or validating the resulting feasibility assessments and roadmaps.

## 5. From local testing to transnational comparison

The pilot action implemented through the five Living Labs was designed not only to test the methodological framework in different territorial contexts, but also to enable a structured transnational comparison of results, processes and implementation conditions. The diversity of ecological settings, Forest Ecosystem Services addressed, governance arrangements and stakeholder engagement models provided the basis for identifying both common patterns and context-specific differences.

This comparative perspective is developed through the synthesis of the ecological and economic assessments, market-oriented experimentation and governance insights documented in **D.2.3.2 – Transnational collaboration report on the ecological and economic valuation of Forest Ecosystem Services**.

### 5.1 Diversity of Forest Ecosystem Services and assessment pathways

Across the five Living Labs, a total of **eleven Forest Ecosystem Services** were assessed, covering provisioning, regulating and cultural categories. The selection of services varied by territory and reflected local priorities, feasibility conditions and stakeholder interests.

The transnational comparison highlights that:

- **regulating services** (such as carbon sequestration, habitat provision and natural hazard protection) were addressed in all Living Labs, although with different emphasis and valuation approaches;
- **provisioning services**, particularly timber, firewood and biomass, were included where relevant to local forest economies, often as part of multifunctional management systems;
- **cultural services**, including recreation, tourism, educational and spiritual services, played a central role in peri-urban, touristic or culturally significant contexts.

Rather than aiming for uniformity, the pilot demonstrated how a common methodological framework can accommodate different FES portfolios, enabling comparison without forcing standardisation.

### 5.2 Comparative insights from ecological and economic valuation

The ecological and economic assessments conducted in the Living Labs provide several cross-cutting insights when analysed at transnational level.

First, valuation results consistently show that **regulating ecosystem services** tend to exhibit high social and economic relevance, even when they are delivered by relatively limited forest areas. In contrast, **provisioning services** often contribute significantly to total economic value due to their spatial extent, but their relative importance varies widely depending on valuation methods and territorial context.

Second, **cultural ecosystem services**, particularly recreation, emerge as key value components in Living Labs characterised by high accessibility, tourism pressure or strong links between forests and local identity.

Third, the comparison confirms that valuation outcomes are highly sensitive to methodological choices, including the use of unit value transfer, adjusted Alpine-wide values or local market-based approaches. **For this reason, valuation results should be interpreted as context-dependent evidence to support informed decision-making, rather than as a definitive or universal ranking of ecosystem services.**

### 5.3 Market frameworks and governance patterns across Living Labs

At transnational level, the pilot action reveals significant diversity in the types of market frameworks, payment schemes and governance arrangements explored in the Living Labs.

Key comparative findings include:

- no single innovative market model is applicable across all contexts;
- public or hybrid governance arrangements are frequently necessary, particularly for regulating and cultural services;
- market-oriented approaches are more feasible when embedded in existing institutional frameworks and supported by public authorities or intermediary organisations;
- socially oriented and mission-driven business models tend to be perceived as more appropriate in terms of social acceptance, governance feasibility and long-term forest stewardship than purely market-driven solutions.

These findings are consistent across Living Labs despite differences in scale, ownership structures and service focus.

### 5.4 Role and added value of transnational collaboration

The transnational dimension of the pilot action generated added value beyond what could have been achieved through isolated local testing.

Transnational collaboration enabled:

- comparison of heterogeneous Living Lab experiences using a shared analytical framework;
- mutual learning among partners on valuation methods, data availability and interpretation;
- identification of common challenges, including data gaps, methodological sensitivity and institutional constraints;
- reflection on transferability of tools and approaches across Alpine regions.

The pilot confirms that **differences among Living Labs can be a resource rather than a limitation**. Making these differences explicit allows for a more realistic understanding of where and how Forest Ecosystem Services markets and payment schemes can be developed.

The transnational comparison provides a structured knowledge base for subsequent phases of the project, including feasibility assessment and roadmap development.

By linking local experimentation with cross-cutting analysis, the pilot action:

- supports evidence-based assessment of implementation conditions;
- informs the refinement of methodological tools and guidelines;
- strengthens the credibility of proposed market frameworks and governance models.

These comparative insights provide key inputs to ***O.2.3 – Regional feasibility assessment for the Living Lab territories based on the results of the pilot experience*** and ***O.2.4 – Regional Roadmaps based on the Living Lab testing results***, which translate the pilot findings into context-specific implementation perspectives.

## 6. Market frameworks, payment schemes and business models

The pilot action enabled the testing and exploration of a wide range of **market frameworks, payment schemes and business models** for Forest Ecosystem Services across the five Living Labs. These were derived from the application of the methodological framework defined in **D.1.3.2** and were further refined and consolidated through the pilot experience, as documented in **O.2.2 – Transnational guidelines and tools for the establishment of public–private markets for the selected Forest Ecosystem Services in Alpine communities**.

Rather than aiming to validate a single solution, the pilot action tested different approaches under real territorial conditions, reflecting the diversity of Forest Ecosystem Services, stakeholder configurations and governance contexts.

### 6.1 Types of market frameworks and payment schemes explored

Across the Living Labs, several types of market frameworks and payment schemes were explored, including:

- **public–private payment schemes** for regulating services, such as biodiversity conservation, carbon sequestration and water regulation;
- **market-based instruments** addressing provisioning services, including biomass and non-timber forest products, often embedded in local or circular value chains;
- **hybrid financing mechanisms** combining public funding, private contributions and user-based payments, particularly for cultural and recreational services.

The pilot confirms that Forest Ecosystem Services markets in Alpine contexts are rarely purely private. In most cases, **public actors play a central role** as initiators, coordinators or co-financers, especially for regulating and cultural services that deliver collective benefits.

### 6.2 Business models tested and analysed in the Living Labs

Building on the economic assessment of Forest Ecosystem Services, the pilot action explored and assessed a set of **Business Model Archetypes** tailored to FES valorisation. These models address different value propositions, governance arrangements and revenue mechanisms, and were analysed in relation to local conditions.

Examples of business model approaches tested or explored include:

- reverse auctions to incentivise biodiversity conservation and carbon-related measures, particularly suited to fragmented private forest ownership;
- tourism- and experience-based models for recreational and cultural services, linked to forest accessibility and visitor pressure;
- public–private partnership models supporting water regulation, natural risk reduction and protective forest functions;
- socially oriented and community-based models addressing cultural, educational and spiritual services.

Across Living Labs, the analysis highlights that hybrid and socially oriented business models often perform better than purely market-driven approaches, especially where long-term forest stewardship, social acceptance and public interest objectives are central.

### 6.3 Role of governance and institutional context

A key insight emerging from the pilot is the decisive role of governance arrangements and institutional context in shaping the feasibility and effectiveness of market frameworks and payment schemes.

The transnational comparison shows that:

- the presence of intermediary organisations (e.g. forest owners' associations, public forestry services, local authorities) is helpful to reduce transaction costs and coordinate stakeholders;
- regulatory frameworks and land-use planning constraints strongly influence which services can be monetised and how;
- stakeholder trust and long-standing institutional relationships facilitate the acceptance of innovative payment schemes.

These governance-related factors often outweigh purely economic considerations when assessing the viability of Forest Ecosystem Services markets.

### 6.4 Transferability and limits of market-based approaches

Building primarily on the transnational comparison of Living Lab results developed in D.2.3.2, and complemented by insights from the economic assessment, participatory process analysis and refined guidelines produced within WP2, the following points summarise the main transferable elements and limitations emerging from the pilot action.

The pilot action confirms that while some principles and tools for FES market development are transferable across Alpine regions, market frameworks themselves are highly context-dependent.

Key transferable elements include:

- structured approaches to FES assessment and valuation;
- decision-support tools for selecting suitable business models;
- participatory processes supporting co-design and legitimacy.

At the same time, the pilot highlights clear limits:

- not all Forest Ecosystem Services can or should be monetised through markets;
- some services require long-term public commitment rather than short-term market solutions;
- oversimplified market approaches risk undermining multifunctional forest management.

These findings reinforce the need for context-sensitive and adaptive approaches, combining economic instruments with governance and policy measures.

### 6.5 Consolidated insights from the pilot experience

Taken together, the pilot action demonstrates that:

- Forest Ecosystem Services markets in Alpine contexts are feasible only when embedded in supportive governance frameworks;

- hybrid models combining public and private roles are often the most effective;
- economic valuation and business models should be used as **decision-support tools**, not as prescriptive solutions;
- the Living Lab approach is particularly suited to testing and refining innovative market frameworks under real-world conditions.

These consolidated insights provide the foundation for the feasibility assessment and the definition of implementation pathways presented in the following chapters.

## 7. Feasibility and readiness for implementation in the Living Labs

The pilot action provided the basis for assessing the feasibility and readiness for implementation of Forest Ecosystem Services market frameworks and payment schemes in the five Living Labs.

From a technical and ecological perspective, the pilot confirms that many forest management measures associated with provisioning, regulating and cultural services are feasible and compatible with existing forestry practices. At the same time, implementation requires adaptation to local conditions and careful consideration of trade-offs among different Forest Ecosystem Services.

From an economic, organisational and legal perspective, feasibility is strongly influenced by governance arrangements and institutional capacity. Regulating and cultural services often show high social value, but their implementation typically depends on public support or hybrid financing mechanisms. Fragmented ownership structures and administrative constraints represent recurring challenges across territories, while intermediary organisations emerge as key actors in reducing transaction costs and supporting implementation processes.

Further details for the single LL areas are provided in ***O.2.3 Regional feasibility assessment for the Living Lab territories based on the results of the pilot experience***, which presents a comprehensive assessment of technical, economic, organisational and legal feasibility for each Living Lab, building on the pilot action results and supporting the identification of implementation-ready solutions.

Overall, the feasibility assessment demonstrates that several Forest Ecosystem Services market frameworks tested during the pilot are ready for further development or scaling, provided that appropriate governance arrangements and support mechanisms are in place.

## 8. Regional Roadmaps: from pilot testing to next steps

The results of the pilot action were translated into Living Lab–specific Regional Roadmaps, which define concrete objectives, priority measures and implementation pathways beyond the project duration.

These roadmaps are documented in ***O.2.4 – Regional Roadmaps based on the Living Lab testing results*** and represent a key bridge between experimentation and long-term implementation.

Across the five Living Labs, the Regional Roadmaps:

- build on the Forest Ecosystem Services selected and tested during the pilot;
- reflect the outcomes of feasibility assessments and stakeholder engagement;
- identify short-, medium- and long-term actions tailored to territorial conditions.

While each roadmap is context-specific, common elements emerge. All roadmaps emphasise the importance of multifunctional forest management, the need for stable governance arrangements and the role of stakeholder commitment in ensuring continuity. Public actors are consistently identified as key enablers, particularly for regulating and cultural services.

The roadmaps also highlight phased implementation approaches, starting with consolidation of tested measures and governance mechanisms, followed by gradual scaling or diversification. In several Living Labs, stakeholder acknowledgement and expressions of interest were collected, reinforcing the legitimacy and ownership of the proposed pathways.

Taken together, the Regional Roadmaps demonstrate how the pilot action results can be operationalised in practice, while remaining adaptable to evolving territorial and institutional contexts.

## 9. Key insights and overall conclusions from the Pilot Action

The transnational pilot action implemented through the network of five Living Labs provides clear evidence of the potential and limitations of market-based approaches to Forest Ecosystem Services in Alpine contexts.

First, the pilot confirms that Forest Ecosystem Services generate significant social and economic value beyond timber production, particularly through regulating and cultural services. Recognising and supporting this value is essential to ensure the long-term sustainability and multifunctionality of Alpine forests.

Second, the application of a common methodological framework across diverse territories demonstrates that standardised tools can support comparison and learning without imposing uniform solutions. The Living Lab approach proved effective in testing, adapting and refining tools and models under real territorial conditions.

Third, the pilot highlights that the feasibility of Forest Ecosystem Services markets depends strongly on governance arrangements and institutional capacity. Hybrid models combining public and private roles, supported by intermediary organisations and participatory processes, emerge as the most viable options across contexts.

Finally, the transnational dimension of the pilot action generated added value by enabling comparison among heterogeneous experiences, mutual learning among partners and identification of transferable principles. Together, these results strengthen the evidence base for future policy development and practical implementation of Forest Ecosystem Services market frameworks in Alpine regions.

## 10. Guide to the supporting documents

This section provides an overview of the main WP2 outputs and deliverables directly related to the Pilot Action, indicating their respective focus and content.

- ***D.1.3.2 – Methodological guidelines and tools to assess Forest Ecosystem Services and develop market frameworks in Alpine communities***  
Defines the methodological baseline for Forest Ecosystem Services assessment, economic valuation, market analysis and business model development.
- ***D.2.1.1 – Report and factsheets on the participatory process in the Living Labs***  
Documents the design, implementation and quantitative and qualitative results of stakeholder engagement and participatory processes in each Living Lab.
- ***D.2.2.1 – FES assessment pilot action report***  
Provides a comprehensive overview of all Living Labs on FES mapping and biophysical assessment.
- ***D.2.3.1 – FES economic assessment pilot action report***  
Presents the results of the economic assessment of selected Forest Ecosystem Services and the analysis of business models tested in the Living Labs.
- ***D.2.3.2 – Transnational collaboration report on the ecological and economic valuation of Forest Ecosystem Services***  
Synthesises ecological and economic valuation results at transnational level and analyses the added value of cross-Living Lab collaboration.
- ***O.2.2 – Transnational guidelines and tools for the establishment of public–private markets for the selected Forest Ecosystem Services in Alpine communities***  
Provides refined and validated methodological guidelines and operational tools derived from the pilot testing of D.1.3.2.
- ***O.2.3 – Regional feasibility assessment for the Living Lab territories based on the results of the pilot experience***  
Assesses technical, economic, organisational and legal feasibility of implementing Forest Ecosystem Services market frameworks in each Living Lab.
- ***O.2.4 – Regional Roadmaps based on the Living Lab testing results***  
Defines Living Lab–specific implementation pathways and next steps beyond the pilot phase.

## 11. ANNEX - Tools supporting the pilot action across Living Labs

Tool		Main purpose
<b>Phase 1 – Discovery</b>		
D-1	Template for Living Lab area description	Description of pilot areas (geographical, ecological, forest and stakeholder context)
D-2	Template for stakeholders' analysis	Stakeholder mapping and identification of target groups
D-3	Minutes template and satisfaction survey	Monitoring and documentation of stakeholder participation
D-4	Template for forest management techniques and relevance for FES	Identification of forest management practices and their influence on FES
D-5	Presentation on the concept of FES	Introduction of the FES concept and awareness raising
D-6	Template for the FES selection process (FES Matrix)	Selection of locally relevant Forest Ecosystem Services
D-7	Template for FES description and indicator factsheets	Preliminary description of FES and definition of indicators
D-8	Template for good practice and business model description	Collection and pre-selection of business model options
D-9	Template for policy and governance information	Identification of relevant policy and governance frameworks
D-10	Checklist for the Living Lab kick-off workshop	Organisation and documentation of kick-off workshops
<b>Phase 2 – Planning implementation</b>		
P-1	Guideline for FES biophysical assessment (A.2.2)	Preparation of biophysical assessment of selected FES
P-2	Sustainable forest management practices / alternatives	Identification of sustainable forest management options
P-3	Guideline for FES economic assessment (A.2.3)	Preparation of economic assessment and business model analysis
P-4	Guidelines and templates for communication activities	Organisation of public events and media communication
P-5	Checklist for transformation workshops	Organisation of workshops focused on business options and FES assessment
<b>Phase 3 – Implementation</b>		
I-1	Implementation of the guideline for FES biophysical assessment	Execution of biophysical assessment, mapping and valuation
I-2	Evaluation matrix and guideline for forest management options	Assessment of alternative forest management options and effects on FES
I-3	Tools for FES economic assessment	Economic valuation of FES and development of business models
I-4	Checklist for the information workshop	Presentation and discussion of assessment results with stakeholders
<b>Phase 4 – Evaluation</b>		

<b>Tool</b>	<b>Main purpose</b>
E-1   Checklist for the reflection workshop	Reflection on results and support to final WP2 outputs