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Guidelines and recommendations on incorporating PES in EU-supported financial programmes

Deliverable 4.2

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About the project

Payments for ecosystem services (PES) schemes are considered a promising economic instrument for diversifying income to forest owners and rural communities while supporting biodiversity and climate mitigation. LIFE ProForPES is an EU funded project that aims at collecting, synthesising and integrating the knowledge and the know-how already present at the national and EU level on PES and PES-like schemes.

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Executive summary

Forest ecosystem services (FES)—including biodiversity conservation, climate regulation, water management, and societal well-being—are increasingly recognised within EU policy frameworks such as the European Green Deal, Biodiversity Strategy, and Forest Strategy. However, despite strong policy alignment, the practical implementation of PES across Europe remains uneven and constrained by governance, financial, and institutional barriers. The ProForPES project therefore addresses a central policy challenge: **how to move from fragmented, context-specific PES initiatives towards scalable, operational, and financially embedded mechanisms within EU funding instruments.**

This deliverable presents evidence-based and stakeholder-validated **guidelines and policy recommendations for integrating Payments for Ecosystem Services (PES) into EU-supported financial programmes**, developed within the LIFE ProForPES project. It builds on prior analytical work, including case study analysis, policy review, SWOT assessment, and stakeholder engagement, with the objective of enhancing both the uptake and effectiveness of forest-related PES mechanisms across Europe.

Based on a review of over 100 PES and PES-like schemes across Europe, an academic literature review, a SWOT analysis of design and implementation conditions, an examination of EU policy and funding frameworks, and an online workshop with experts, seven core design themes have as building blocks for PES schemes:

- Targeted ecosystem services
- Temporal framework
- Geographical scope
- Financial architecture
- Monitoring, reporting, and verification (MRV)
- Payment design
- Promotion and facilitation mechanisms

These dimensions constitute a flexible framework allowing PES schemes to be tailored to context-specific ecological, institutional, and socio-economic conditions.

In a next step, seven scenarios for Forest PES implementation have been developed, each building on a specific set of options along the seven core design themes. The seven scenarios are

- Scenario 1: Paying for better forest biodiversity through the common agricultural policy (CAP).
- Scenario 2: Protecting water resources through watershed-scale PES.
- Scenario 3: Paying for verified forest carbon removals.
- Scenario 4: Paying for climate resilience and fire risk reduction.
- Scenario 5: Paying for urban cooling and well-being through urban and peri-urban forest PES.
- Scenario 6: Integrated landscape PES for bundled ecosystem services.
- Scenario 7: Securing drinking water at its source through utility-led PES.

These scenarios have been discussed with stakeholders during a workshop in May 2026, and the comments and input based on these discussions have resulted in minor adjustments to the scenarios, and **12 policy recommendations to strengthen PES integration into EU funding frameworks**:

1. **Ensuring legal and financial stability** over ecologically meaningful timeframes;
2. **Promoting blended finance models** that combine public and private resources;
3. **Adopting hybrid payment designs** to balance feasibility and environmental performance;
4. **Developing proportionate MRV systems** aligned with existing reporting structures;
5. **Improving communication and awareness** to increase stakeholder engagement;
6. **Establishing a European Forest PES Gateway** to support knowledge exchange and implementation;
7. **Encouraging context-sensitive bundling of ecosystem services**;
8. **Targeting PES spatially based on ecological functionality** rather than administrative units;
9. **Strengthening governance, inclusiveness, and intermediary roles**;
10. **Integrating PES into broader policy frameworks**;
11. **Leveraging CAP as a primary entry point while improving its forestry focus**;
12. **Developing a dedicated EU forest PES mechanism** complementary to existing instruments.

The deliverable concludes that PES represents a strategically important mechanism for mobilising both public and private finance to support sustainable forest management and ecosystem service provision.

However, achieving scale and effectiveness requires:

- Institutional integration across EU policies and funding instruments;
- Simplification of administrative procedures;
- Increased transparency, credibility, and stakeholder trust;
- Adaptive, context-sensitive design approaches.

By combining scenario-based analysis with concrete recommendations and an implementation-oriented action matrix, the deliverable provides a comprehensive roadmap for embedding PES within future EU funding programmes and advancing the transition towards multifunctional, resilient forest landscapes in Europe.

Table of contents

Executive summary	2
List of Tables	5
List of Abbreviations and Acronyms	6
Acknowledgments	6
1. Foreword	7
2. Introduction and objectives	7
2.1. Why PES integration into EU funding programmes matters	7
2.2. Objective	8
2.3. Structure of the document	8
3. Methodology	8
3.1. Developing scenarios and recommended options	8
3.2. Collecting stakeholder feedback through a co-design workshop	9
3.3. Processing workshop feedback and developing final recommendations	10
4. Seven design themes as building blocks for PES	11
5. Generalised feedback from the scenario workshop	13
6. Seven scenarios for integrating PES into European financial instruments	16
6.1. Scenario 1: Paying for better forest biodiversity through the common agricultural policy (CAP)	16
6.2. Scenario 2: Protecting water resources through watershed-scale PES	18
6.3. Scenario 3: Paying for verified forest carbon removals	20
6.4. Scenario 4: Paying for climate resilience and fire risk reduction	22
6.5. Scenario 5: Paying for urban cooling and well-being through urban and peri-urban forest PES	24
6.6. Scenario 6: Integrated landscape PES for bundled ecosystem services	26
6.7. Scenario 7: Securing drinking water at its source through utility-led PES	28
6.8. Cross-scenario comparison	30
7. Policy recommendations for better integrating PES in European funding instruments	34
7.1. PES Framework and Future EU funding programmes	34
7.2. Tangible recommendations for future PES schemes	34
1. Enable legal and funding stability over ecologically meaningful timeframes	34
2. Consider blended finance as a complementary funding model	35
3. Use more hybrid-payment (action- and result-based) design in future PES schemes	35
4. Build robust, proportionate MRV systems aligned with existing reporting obligations	36
5. Improve communication, simplify terminology and invest in awareness raising	36
6. Establish a European Forest PES Gateway and wider support infrastructure	37
7. Support context-sensitive bundling of forest ecosystem services	37
8. Target PES within their spatial, ecological-functional contexts, not only administratively	38
9. Strengthen inclusiveness, governance quality and the role of intermediaries	38
10. Integrate PES into wider land-use, forest and environmental policy frameworks	39
11. Use CAP as main EU-wide entry point for PES and improve its forestry focus	39
12. Develop a dedicated EU forest PES mechanism, building on a wider funding mix	40
7.3. Implications for future EU funding programmes	40
8. Guidelines for implementing the recommendations	41
9. Conclusion	50
References	51
Glossary	52

List of Tables

Table 1. PES scheme design themes and their selected recommended options	10
Table 2. Recommended options for scenario 1 (Paying for better forest biodiversity through the Common Agricultural Policy)	14
Table 3. Recommended options for scenario 2 (Paying for watershed protection through basin-scale forest management)	16
Table 4. Recommended options of scenario 3 (Paying for verified forest carbon removals)	18
Table 5. Recommended options of scenario 4 (Paying for climate resilience and forest wildfire risk reduction)	20
Table 6. Recommended options of scenario 5 (Paying for urban cooling and well-being through urban and peri-urban forests)	22
Table 7. Recommended options of scenario 6 (Paying for bundled forest ecosystem services at landscape scale)	25
Table 8. Recommended options of scenario 7 (Paying for drinking water source protection through utility-led PES)	27

List of Abbreviations and Acronyms

BOKU	Universitaet fuer Bodenkultur Wien
CAP	Common Agricultural Policy
CICES	Common International Classification of Ecosystem Services
CRCF	Carbon Removal Certification Framework
EFI	European Forest Institute
ES	Ecosystem Services
ESG	Environmental, Social and Governance
ETIFOR	Etifor Valuing Nature
FES	Forest Ecosystem Services
FSC	Forest Stewardship Council
HNEE	Hochschule fuer Nachhaltige Entwicklung Eberswalde
MRV	Monitoring, reporting, verification
NGO	Non-Governmental Organisation
NRR	Nature Restoration Regulation
OpenNES S	Operationalisation of Natural Capital and Ecosystem Services
PEFC	Programme for the Endorsement of Forest Certification
PES	Payments for Ecosystem Services
SWOT	Strengths, Weaknesses, Opportunities and Threads
UNIPD	Università degli Studi di Padova
WFD	Water Framework Directive
WUI	Wildlife-urban interface

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1. Foreword

The LIFE ProForPES project aims at collecting, synthesising and integrating the knowledge and the know-how present at the national and European Union level on Payments for Ecosystem Services (PES). ProForPES Working Package 4 aims to develop guidelines and recommendations for integration of PES in future funding schemes. Based on work done in previous work packages, Task 4.1 has developed potential scenarios, preliminary guidelines and recommendations for integrating PES in European funding schemes. These have then been discussed during a stakeholder workshop in Vienna (26 March 2026).

The present Deliverable 4.2, “*Guidelines and recommendations on incorporating PES in EU-supported financial programmes*” builds on the discussions with the stakeholders during this session, and present evidence-based and stakeholder-validated recommendations and guidance for integrating PES in European financing mechanisms.

2. Introduction and objectives

2.1. Why PES integration into EU funding programmes matters

The integration of Payments for Ecosystem Services (PES) and PES-related mechanisms into EU funding programmes matters because Forest Ecosystem Services (FES) are increasingly recognised as essential for climate mitigation and adaptation, biodiversity conservation, water regulation, soil protection, and wider societal well-being. Across the EU policy landscape, this recognition has become more visible through the European Green Deal, the EU Biodiversity Strategy for 2030, and the EU Forest Strategy for 2030, all of which strengthen the policy relevance of ecosystem services and support the development of financial incentives for their provision. In particular, the Forest Strategy for 2030 explicitly links the multifunctional role of forests to the need to support forest owners and managers through financial incentives for the provision of ecosystem services, while the Biodiversity Strategy promotes the development of innovative financial incentives and result-based approaches.

At the same time, the project’s analytical work shows that the practical uptake of PES across Europe remains uneven and often constrained by design, governance, and funding challenges. The analysis of PES and PES-related mechanisms in Europe highlights that, although a broad variety of arrangements exists, many schemes remain strongly context-dependent, and face difficulties related to transaction costs, low payment levels, legal uncertainty, information gaps, and barriers to participation. The evidence also shows that EU financial support and state aid are considered important for PES development, but that access to these resources is often hindered by administrative complexity and bureaucratic burdens. In many cases, local or regional funding arrangements are perceived as more workable than EU-level schemes because they are easier to access and better adapted to local realities.

The EU-wide PES cases SWOT analysis further confirms that the successful implementation of PES depends not only on funding availability but also on institutional and political support, effective governance, monitoring capacity, and the existence of clear and workable implementation conditions. High transaction costs, bureaucratic burdens, fragmented decision-making, lack of coordination, and insufficient long-term support remain major obstacles. At the same time, the European context also offers important enabling conditions, including growing environmental awareness, relatively high levels of education and access to information, institutional legitimacy, and increasing public and private interest in investing in nature-based solutions. These conditions suggest that the challenge is not whether PES is relevant, but how it can be better structured and integrated into supportive policy and funding frameworks.

Within LIFE ProForPES, this is precisely where EU funding programmes become important. The wider project is designed to promote a more effective integration of PES and PES-like schemes within the EU financial framework, with the ambition of increasing both the implementation and the effectiveness of these mechanisms at the European level. Earlier work packages, therefore, examine both the practical experience of PES in Europe and the gaps and opportunities for integrating these mechanisms into funding programmes and state aid frameworks. In this context, integrating PES into EU funding programmes is not only a policy opportunity but also a practical necessity for moving beyond isolated case-specific schemes toward more stable, scalable, and operationally supported approaches.

2.2. Objective

This deliverable aims to present co-designed, feasible and relevant recommendations and guidelines for integrating PES-schemes for forest ecosystem services in EU financial programmes.

2.3. Structure of the document

Following the introduction in this section, the methodology to produce this document is elaborated in section 3.1, starting from situating the previous work done in the ProForPES project. This work has led to the development of preliminary guidelines and policy recommendations for integrating PES in European financial programmes (see project deliverable D4.1, Nazari & Vacik 2026), along seven PES design themes presented in section 4. As explained in section 3.2, these preliminary recommendations have been discussed in a final co-design workshop, which findings have been reported in section 5. Section 6 presents the scenarios along the seven design themes for PES, including stakeholder feedback, the benefiting actors and the expected outcomes.

In section 7 we present policy recommendations for better integrating PES in European funding instruments, followed by more concrete guidance on actions (by stakeholder type) for implementing the policy recommendations.

3. Methodology

3.1. Developing scenarios and recommended options

In Task 4.1, plausible and policy-relevant scenarios for integrating PES and PES-related schemes in EU funding mechanisms have been developed, based on the previous work in the ProForPES project. These scenarios were based on

- Analysis of over 100 PES and PES-related mechanisms across Europe (D2.2, Nazari et al. 2024), looking into operational arrangements, institutional settings, financial and funding structure, and barriers and opportunities for success. This analysis provided insights into the feasibility and scalability of current approaches and highlighted the importance of design, institutional conditions and context.
- SWOT assessment of current approaches, to identify enabling conditions, barriers, strengths and weaknesses (D2.3, Brusa et al. 2024). This analysis provided input on governance quality, financial constraints, implementation hurdles (including avoiding overcomplexity), participatory engagement, monitoring needs, and the need for long-term sustainability. The analysis identified which design combinations are more robust, where implementation risks may emerge and the practical conditions to be considered.
- Reviewing EU policy documents and EU financing programmes to sketch the current EU policy framework related to PES, and how PES-schemes are actually operationalised in EU financing programmes (D3.1, Corradini et al. 2025). This also included PES-like schemes, and analysis of non-forest related PES schemes. Mechanisms such as the Common Agricultural Policy (CAP), the Carbon Removal Certification Framework (CRCF) and the Nature Restoration Regulation (NRR) include policy and operational reference points for future forest PES integration. This review indicated a gap between the growing recognition of the relevance of forests and the ecosystem services they provide in policy documents, versus the limited operationalisation of PES design and the limited financial commitment towards forest ecosystem services and related PES-schemes,
- Stakeholder assessment of current and future PES design options under diverging general trends (based on the OpenNESS scenarios) that depict how different PES designs can be operated, including variations in FES buyers, seller, funding opportunities, conditionalities, stakeholder roles etc. through a Delphi process and an online workshop with more than 60 participants (reported in D3.1, Corradini et al. 2025). This in-depth assessment of PES design preferences, and stakeholder/expert indicated potentials, chances and challenges indicated four main directions for the policy recommendations:
 1. PES terminology is unevenly understood and mixedly used by stakeholders such as forest owners/managers, policy makers from different sectors and administrative levels, NGOs,

business; a simpler and more accessible framing and terminology may be needed for a wider engagement in policy, practices and business.

2. There is a preference for blended PES funding approaches, combining public and private funding.
3. Similarly, the payments should be based on a hybrid model as well, combining action-based core funding, complemented with results-based incentives as premium.
4. Strong governance with clear frameworks, public oversight, clear conditionalities and workable monitoring and reporting is needed for effective PES implementation, pledging for PES as part of a policy mix.

These sources provided the empirical grounding, analytical structure, policy orientation and stakeholder input to develop further realistic Forest PES scenarios and recommendations. These have been described in D4.1 (Nazari & Vacik 2026) and discussed with experts and stakeholders during a workshop on 26 March 2026.

The seven scenarios are

- Scenario 1: Paying for better forest biodiversity through the common agricultural policy (CAP).
- Scenario 2: Protecting water resources through watershed-scale PES.
- Scenario 3: Paying for verified forest carbon removals.
- Scenario 4: Paying for climate resilience and fire risk reduction.
- Scenario 5: Paying for urban cooling and well-being through urban and peri-urban forest PES.
- Scenario 6: Integrated landscape PES for bundled ecosystem services.
- Scenario 7: Securing drinking water at its source through utility-led PES.

The scenarios are structured design configurations, built along the seven PES design themes (see section 4), which allows comparison of alternative PES models in a clear and consistent way. This reflects a central insight from PES design: scheme performance depends not on one feature alone, but on how core design choices fit together in practice, including targeting, contract design, monitoring, funding, and transaction costs.

3.2. Collecting stakeholder feedback through a co-design workshop

The workshop, held in person in Vienna on March 26, 2026, aimed to engage stakeholders in the analysis of the seven formulated PES application scenarios, and to co-design policy recommendations by experts and stakeholders from policy, practice, business and research. The workshop had four guiding objectives:

1. to assess the feasibility of the proposed scenarios and their recommended options, taking into account existing policy frameworks, funding structures and administrative conditions,
2. to review and discuss the preliminary guidelines and recommendations for integrating PES and PES-related mechanisms into EU funding programmes,
3. to identify key challenges, risks, gaps and constraints that may affect implementation of the recommendations,
4. to identify enabling conditions and required actions for implementing the recommendations.

In preparation of the workshop, 240 people with expertise relevant to PES design, policy and implementation were invited, from whom 35 finally attended. These included

- forest owners and land managers,
- public authorities and policymakers,
- NGOs, facilitators and intermediary organisations,
- researchers and technical experts,
- market actors and private-sector representatives.

This composition guaranteed multiple relevant perspectives across countries, governance and implementation levels and actor types.

After a general introduction to the project, and the main outcomes and observations so far, the participants were invited to assess each of the 7 developed Forest PES scenarios. This assessment included providing individual feedback on the relevance and feasibility of the components of the scenarios, followed by a

prioritisation exercise. Based on the prioritisation, four scenarios were selected for in-depth discussion in four focus groups (one scenario per group). The discussion was organised around four dimensions:

1. validating the logic and structure of the scenarios,
2. evaluating the feasibility, relevance and appropriateness of the recommended design features in the scenario,
3. identifying barriers, constraints, challenges, risks and potential unintended effects of the scenario,
4. identifying enabling actions and policy needs that could support operationalising the scenarios.

Both the individual feedback and the feedback from the focus group sessions are presented below and have been used to develop the final recommendations on incorporating PES schemes in EU policy and financing frameworks.

Deliverable D4.1 (Nazari & Vacik 2026) provides more information on the background of the participants, the rationales for selection, the setup of the workshop and the methods applied to gather feedback.

3.3. Processing workshop feedback and developing final recommendations

Minute-takers took notes for the four selected workshops and comments on all seven scenarios were collected during the gallery walk. We have summarised these comments along the seven design themes (section 5). These notes served as the basis for revising the preliminary scenarios into the final scenarios (see section 6) and developing the final recommendations (section 7).

4. Seven design themes as building blocks for PES

Based on a literature and policy review, the SWOT analysis of existing practices and the stakeholder analysis of PES design options, seven common design themes have been defined that are crucial for an effective PES scheme: ecosystem services targeted, temporal framework, geographical scope, financial framework, implementation control systems, payment scheme design, and promotion and facilitation mechanisms. These themes provide a structuring framework for developing PES schemes in a flexible way. For every theme, several options have been described, allowing for context-dependent configurations under varying governance conditions, funding arrangements, legal frameworks and implementation requirements. There is no generic best option (or combination of options), but according to the context, some options are more relevant or feasible than others.

Each of the seven themes captures a distinct aspect of PES design. The table below summarises the themes and potential options per theme. The list of options is not exhaustive; rather, it is based on the ProForPES project, including the literature review, the SWOT analysis of current practice, and experts' and stakeholders' assessments.

Table 1. PES scheme design themes and their selected recommended options

Design theme	Possible recommended options categories
Forest ecosystem services targeted	Single service (e.g. biodiversity, carbon capture, water quality, water quantity regulation) versus services bundles of multiple ecosystem services
Temporal framework	Short-term, medium-term or long-term
Geographical scope	Uniform national schemes, targeted areas (e.g. protected areas or Natura 2000 sites), functional landscapes, watersheds
Financial framework	EU public funding, national/state aid, private funding, blended funding (mixed public and private funding)
Implementation control systems (Monitoring, Reporting, Verification)	Results-only monitoring, practice compliance, remote sensing, modelling
Payment design	Action-based, results-based, hybrid (action- & results-based), collective schemes
Promotion and facilitation mechanisms	Information campaigns, advisory support, intermediaries, regulatory integration, coordination

The first theme, **forest ecosystem service(s) targeted**, refers to the specific ecosystem service, or bundle of services, on which the PES mechanism is focused. This may involve a single service, such as biodiversity protection or watershed regulation, or a bundle of services where multiple benefits are supported. The selection of targeted services can be guided by policy relevance, programme scope, ecological and social importance, or feasibility of operationalisation. Where appropriate, bundled services can be considered because PES schemes in practice generate multiple ecosystem services even if payments focus on one service only. Single-service oriented frameworks are less complex to operate, easier for forest managers to comply with, and require less monitoring and verification. On the other hand, the focus on one service can lead to negative impacts on other ecosystem services (e.g. decreased biodiversity when selecting particular species that have higher carbon sequestration). ProForPES has followed the Common International Classification of Ecosystem Services (CICES, Haines-Young & Potschin-Young 2018) classification when describing the selected ecosystem services in the specific scenarios.

The second theme, **temporal framework**, concerns the duration and continuity of the mechanism. The duration ranges from short-term (< 5 years) to medium-term (5 to 10 years) contracts and long-term commitments (over 10 years). This theme is important because contract duration must reconcile ecological timeframes, programme cycles, policy and management flexibility, and the willingness of landowners and managers to participate. Short contracts may limit ecological impact, whereas very long contracts may

reduce forest managers' or ecosystem service buyers' willingness to participate. Also, the adaptability to changing circumstances is less with longer contract-terms (unless provisions for mid-term evaluation and adaptation are included in the contract). For these reasons, medium-term commitments with periodic review are often considered a workable intermediate option. The contract term can also be aligned with the time horizon of for example the forest management plan or water management plans (typically 10 to 20 years).

The third theme, **geographical scope**, refers to the spatial logic of PES implementation. The options considered include broad territorial schemes, targeted areas (e.g. protected areas or Natura 2000 sites), and functionally defined landscapes (going beyond forests). Earlier evidence suggests that PES effectiveness generally improves when payments are directed to areas where ecological additionality is highest, such as biodiversity hotspots, source catchments, hazard-prone regions, or other functionally connected landscapes. For this reason, geographically targeted approaches are often more relevant than uniform nationwide schemes, unless the service itself justifies broader coverage.

The fourth theme, **financial framework**, captures the main funding architecture supporting the scheme. The categories considered include EU public funding, national or state-aid-based funding, private funding, and blended models (mixed public-private funding). This distinction is important because earlier work in ProforPES showed that funding stability, source diversity, and compatibility with programme rules are central to PES feasibility and sustainability. Successful schemes often rely on a stable core source of funding, potentially complemented by secondary contributions, while beneficiary-pays logic may also be relevant in some contexts.

The fifth theme, **implementation control systems**, concerns the way compliance or outcomes are verified. The categories considered include results-only monitoring, practice compliance, remote sensing, modelling, and combinations of these approaches. This theme is critical because monitoring design influences transaction costs, fairness, credibility, and administrative feasibility. Purely results-based monitoring is not always appropriate, especially where ecological outcomes are difficult to attribute to individual forest managers or interventions, or can be affected by external factors. In such cases, combined systems using compliance checks, indicators, remote sensing, and on-site verification may be more workable.

The sixth theme, **type of payment design**, refers to the basic payment logic of the mechanism. This includes action-based schemes (upfront, when interventions are implemented), results-based schemes (rewarding the results achieved), hybrid approaches (combining action-based and result-based payments), and collective schemes. This distinction is central to PES design because it shapes incentives, risk allocation, administrative complexity, and the relationship between payment and performance. Hybrid approaches combine the operational simplicity of action-based payments with stronger performance orientation through result-based elements. Collective schemes are also important in contexts where ecosystem processes operate at the landscape scale and cannot be effectively addressed through isolated parcel-level contracts, or where the results cannot be attributed to individual owners or managers (e.g. water quality in a catchment).

The seventh theme, **promotion and facilitation mechanisms**, concerns the enabling measures through which financial programmes can support uptake and implementation. The categories considered include information campaigns, advisory support, intermediary organisations, regulatory integration, and coordination mechanisms. This theme was included because both the case-based evidence and the workshop-related material underline that PES success depends not only on payment design, but also on institutional support, communication, technical assistance, and the reduction of transaction costs. Advisory services, scoring systems, intermediary support, and integration into existing planning or programme structures are therefore not peripheral, but often decisive for practical implementation.

5. Generalised feedback from the scenario workshop

During the workshop, a prioritisation exercise, based on feasibility and preferences, was conducted to identify which of the PES application scenarios are considered by stakeholders as most future relevant ones. The four scenarios receiving the highest priority scores have been discussed in detail with the workshop participants.

- Scenario 1: Paying for better forest biodiversity through the common agricultural policy (CAP).
 - Scenario 4: Paying for climate resilience and fire risk reduction Interpretation note.
 - Scenario 6: Integrated landscape PES for bundled ecosystem services.
 - Scenario 7: Securing drinking water at its source through utility-led PES.
1. **Forest ecosystem services targeted:** three out of the four discussed scenarios focused on one ecosystem service (biodiversity, wildfire prevention, protecting drinking water), while one scenario (scenario 6) is an integrated scenario where beneficiaries are rewarded for delivering multiple ecosystem services. The workshop participants appreciated that the focused scenarios lead to less cost, less administrative burden and decreased complexity of the monitoring and verification (compared to PES schemes integrating multiple ecosystem services). On the other hand, participants appreciated that such a simple approach does not reflect reality, where improving one ecosystem service usually comes with co-benefits such as an increased delivery of other ecosystem services as well. This is not reflected in payments which reward the increase in the other ecosystem services. Scenario 7 (improving water quality) is such an example: improving the sourcewater quality will not only lead to reduced costs for producing drinking water, but will also lead to increased biodiversity in the waterbodies and on the surrounding land. On the other hand, there is a risk that the focus on one ecosystem service (e.g. reducing wildfire risks) comes at the cost (trade-off) of other ecosystem services (e.g. decreasing biodiversity due to removing deadwood and understory).

Participants in the discussion on the integrated scenario (scenario 6) confirmed that they prefer integrated scenarios, whilst on the other hand such scenarios come with added complexity. Bundles make it possible to recognise values across a wider range of ecosystems and include spaces that would be overlooked by single ES focus. The group suggested a more gradual approach when building integrated scenarios: starting with initiating a PES scheme based upon one ecosystem service, to reduce the initial cost and complexity whilst creating trust and familiarity with the prospective beneficiaries. When the system is well established and accepted by the beneficiaries (foresters and landowners) in the target region, additional ecosystem services can be added. This also allows for “learning while doing”, and to set up a development path for the ecosystem services involved and the associated payments.

2. **Temporal framework:** the participants confirmed the trade-offs regarding the length of the contracts: shorter terms (< 5 years) can be more attractive for prospective beneficiaries, but can be too short to produce or demonstrate positive impacts on ecosystem services. Longer-term (>15 year) contracts can be appreciated as too binding, as conditions can change. On the other hand, some foresters prefer long-term stability in their income and could be interested in longer-term contracts. A suggestion was made to link the term of the contract to the duration of forest management plans, which are usually around 15 to 25 years. Overall, the need for funding stability has to be balanced with flexibility in the duration of agreements. Contract durations should resonate with funders', communities', buyers' and beneficiaries' willingness and management aims. In the initial phase of starting a PES scheme, shorter term contracts can be preferable, as pilot projects that create the ground and trust for a further development of the scheme. In the case of scenario 1, the short CAP funding cycles (6 years) were seen as too short.
3. **Scope:** the initial theme is framed as geographical scope, but from the discussions it became clear that scope should be interpreted more widely: e.g. as catchment, or as community-based action. Although these scopes have a geographical component, the logic is either ecological/environmental (catchment approach, scenario 7) or socio-ecological (focusing on local communities, scenario 6). In scenario 1 (CAP-based), a discussion developed around the focus on protected areas only, while biodiversity enhancement in non-protected areas is also important. Similarly, in scenario 4, the need

to broaden the scope to land use other than forests was stated (as wildfires frequently start in abandoned areas or agricultural areas). The group discussing the integrated scenario (scenario 6) indicated that such scenarios are an opportunity to work with local communities, with the PES scheme contributing to economic development based on the uniqueness of the area.

Context-sensitiveness was also stated as important: for example, a wildfire prevention scheme in boreal areas or alpine areas is different from one in Mediterranean areas.

Finally, extending PES schemes beyond a single focus on forests has been suggested for scenario 1 (CAP-based), scenario 6 (integrated landscape approach) and scenario 7 (catchment approach including multiple land uses).

4. **Financial framework:** simplicity, funding stability and low operational costs are the key outcomes of the financing related discussions. The CAP-based (scenario 1) and drinking water-based (scenario 7) scenarios use existing and well-developed schemes (respectively CAP schemes and drinking water tariffs), and intermediaries may already be present (forest advisors, agriculture agencies, drinking water companies), which reduces the costs for collecting the financial contributions. But these schemes still need infrastructure to monitor the interventions by the beneficiaries, and the results of these interventions.

All groups agreed on the need for blended financing, combining public and private capital. The role of the public sector was mainly seen in initiating and setting up the PES scheme, probably supporting the operational costs in the longer term, while the private sector is contributing through buying the services and offsetting the overhead and the operational costs in the longer term.

A specific comment was related to the long-term perspective of the PES scheme: to persuade foresters and land managers to participate, it should be clear how the financing will evolve when the targeted improvements are realised, and the requested ecosystem services are delivered.

5. **Implementation control systems (MRV):** monitoring and verifications are the cornerstone for credible PES schemes but come with a high cost and a high workload for the beneficiaries. Therefore, the criteria monitored should be carefully selected, harmonising these with other reporting duties (e.g. in the frame of the Nature Restoration Regulation, the Water Framework Directive, or forest certification schemes such as FSC and PEFC). The indicators should also be relevant for communicating the benefits to all actors involved (ES buyers, PES beneficiaries, general public), which increases the awareness and acceptance of PES.

Data collection should integrate remote sensing and AI technologies, which increasingly become available at a lower cost. However, field verifications will still be needed. Proxies can be used to assess impacts on associated ecosystem services (particularly in the integrated scenario 6).

6. **Payment design:** participants were more in favour of results-based payments (instead of action-based payments), although they urged that the schemes should take into account external conditions that could impact the results. For example, floods can negatively impact the water quality, and even when the land management is positively contributing under the impulse of the PES scheme, such a flood event can lead to negative results instead of showing a positive evolution. The beneficiary should not be penalised for these outcomes, which are outside his/her influence. Likewise, in the wildfire prevention scenario (scenario 4), participants stated that wildfires that started outside the land contracted in the scheme, should not impact the payments to the forest managers whose forest has been involved. An internal insurance mechanism (financial buffer or unsold ecosystem services) can be set-up, to compensate beneficiaries who are confronted with external negativities, or to cope with unexpected problems.

Similarly in the catchment approach (scenario 7), other land uses can negatively impact the performance of the forest contracted in the scheme, hiding the improvement in the indicators monitored. Similarly in the integrated landscape scenario (scenario 6), concerns about how to assign the benefits to specific ecosystem services and specific land managers/beneficiaries have been raised.

Finally, the focus on result-based payments also creates a need for mid- to long-term contracts, as results such as improved biodiversity, enhanced structural quality or enhanced environmental quality usually are only measurable after a couple of years.

7. **Promotion and facilitation mechanisms:** the workshop discussions confirmed the alignment of several application scenarios with policy frameworks such as CAP (scenario 1), CRCF (scenario 4) and the water framework directive (scenario 7), but also the possible integration with forest management planning (scenario 4), forest certification (scenario 1) or ESG reporting (Environmental-Social-Governance performance, scenario 1).

There is a clear need for strong and clear coordination and effective intermediaries. The involvement of public authorities can increase the credibility of the scheme (but can reduce land managers' willingness to participate). The schemes need to be clear, transparent, credible and legitimate, so increase trust by all actors involved. Social dynamics should be taken into account, working with already engaged communities or willing foresters could be interesting, particularly in the pilot phase (scenario 6). In all cases, easy access to the system should be facilitated, through simplified funding mechanisms, support in monitoring and verification, and overall low degree of bureaucracy.

Intermediaries can play an important role, as efficient, effective and objective advisors and go-betweens that help beneficiaries and ES buyers through the system.

Clear, transparent and stable legal and financial frameworks and funding schemes are a necessity for effective and efficient PES schemes.

Finally, the role of communication was stressed: monitoring results can be translated into easy-to-understand stories or dashboards. Such approaches help beneficiaries to get insight in their impact, support awareness with the general public, can be used by ES buyers to communicate on their investment and increase political support and will to facilitate PES schemes.

An interesting discussion was held on the ambition level of PES, also in relation to legal requirements. The workshop participants indicated that PES should not focus on reaching the minimum required level, as this is a legal requirement that every land manager should reach, whilst financial compensation in the form of PES is not appropriate in such cases. PES schemes are focussed on facilitating beneficiaries in going beyond the minimum legal requirements. The scheme funding design could include a stepwise approach: no or only limited payment is foreseen for reaching the minimum legal requirement; above the minimum requirement, increasing payments are foreseen when the impact increases (up to a certain level).

Finally, an interesting discussion took place on compensating foresters who already perform well, versus foresters who are performing less well; which group needs (or deserves) more financial support? The ones who perform well probably invested in the past, without PES payments. From an economical point of view, paying them leads to limited additionality. Paying more for low performing foresters will lead to higher impacts and more economic return-on-investment, but may lead to feelings of unfairness with the well-performing beneficiaries. This discussion also relates to which baseline to use.

6. Seven scenarios for integrating PES into European financial instruments

Based on the feedback during the workshops, the scenarios that have been presented to the workshop participants have been revised to reflect participants' comments and suggestions. These scenarios are proposed in more detail in Deliverable 4.1.

6.1. Scenario 1: Paying for better forest biodiversity through the common agricultural policy (CAP)

This scenario rewards forest managers for addressing biodiversity decline in European forests by using the most scalable and administratively established EU funding instrument currently available: CAP Pillar I eco-schemes. The scenario focuses on improving habitat quality through retaining habitat trees, deadwood and mixed-age forest structure. The scenario is focussed on improving habitats in priority biodiversity zones (e.g. Natura 2000), but is also open to forests outside these locations.

Biodiversity in forests is a classic public good, with broad societal benefits but weak private market demand, making publicly financed PES the most realistic large-scale solution. By embedding habitat-focused actions within the existing CAP architecture, this scenario combines ecological priority with institutional feasibility, avoiding the need for a new instrument while ensuring EU-wide reach. It reflects both project evidence and European practice, which show that action-based or hybrid biodiversity schemes are more operationally viable at scale than purely results-based approaches. In short, Scenario 1 represents the most policy-compatible and potentially scalable pathway where legal eligibility and national design permit for integrating forest biodiversity PES into existing EU funding structures.

Table 2 lists which options are selected to fit with the scenario, along the seven PES design themes.

Table 2. Recommended options for scenario 1 (Paying for better forest biodiversity through the Common Agricultural Policy)

Theme	Recommended Option for S1
1. Forest ecosystem services targeted	Biodiversity: Maintaining and enhancing habitats and gene pool protection (<i>CICES: Regulation & Maintenance</i> → <i>Lifecycle maintenance, habitat and gene pool protection</i>) - this ecosystem service type focuses on the ecological conditions that support biodiversity (habitat features, structural conditions).
2. Temporal framework	Medium-term commitments (5–7 years) aligned with CAP programming cycles, with periodic review and adjustment of compliance and ecological progress (e.g. every 1–2 years). This allows for observing results and impacts, while still being an attractive timeframe for forest managers to commit to. The timeframe can however still be too short to be able to observe impacts and results.
3. Geographical scope	Focus on conservation areas and priority biodiversity zones (e.g. Natura 2000 sites and nationally mapped biodiversity hotspots) with management requirements tailored to regional ecological conditions but also open to forest managers outside the focus zone.
4. Financial mechanism	Public: EU public funding only for CAP strategic plan interventions (e.g. eco-schemes under Pillar I), providing annual or multi-annual payments for biodiversity-enhancing forest management practices. As many other ecosystem services, biodiversity is a common good, but biodiversity does

	not create direct benefits to stakeholders (in contrast to for example water quality or carbon sequestration which can benefit corporations or utilities).
5. Implementation Control Systems (Monitoring, Verification and Reporting)	Habitat-quality indicators (deadwood volume, age structure, habitat features (tree cavities, microhabitats), structural diversity index), measured through remote sensing (canopy cover patterns, gaps/structural complexity proxies, disturbance history) and on-site verification (deadwood volume, set-aside habitat trees) and administrative checks using CAP monitoring systems.
6. Payment design	Hybrid: action-based funding (e.g. for selective thinning of unproductive trees) + result-based ecological performance bonus for higher-quality thresholds (based on impact observed in the forest), implemented through CAP Eco-scheme instrument. The payment design allows for deviations, so owners will not be impacted for outcomes they cannot control.
7. Promotion and Facilitation Mechanisms within financial programme	Integration into CAP Strategic Plans, supported by European Commission policy guidance combined with Member State implementation tools (e.g., scoring systems, administrative procedures), advisory services, intermediary support, and collective/coordinated participation options, to ensure coherent delivery. Operational and reporting links with forest management plan reporting and/or forest certification schemes can reduce additional workload and lead to win-win situations, whilst increasing the legitimacy and credibility of the scheme. There is also an opportunity to link with ESG reporting by corporations.

Stakeholder feedback

A drawback of this scenario, and the CAP funding in general, is the limited funding available for forestry in the CAP, combined with a limited uptake of forest-related measures in the national implementation of the CAP by the Member States. The CAP funding can also be not available due to the number of applications being above the available budget. Stability in funding and the rules and regulations is important to enable uptake and participation. The CAP schemes are also still perceived as being too complex and bureaucratic.

Who benefits?

- Forest owners / land managers: predictable payments for biodiversity-friendly forest management, with manageable entry conditions.
- Member States / managing authorities: progress toward biodiversity targets using existing Common Agricultural Policy mechanisms.
- Environmental authorities: measurable habitat improvements using accepted indicators.
- Citizens/Society: more resilient, diverse forests and associated ecosystem co-benefits.

Expected outcomes

- Policy outcomes: improvement in forest habitats in targeted priority areas; increased uptake of biodiversity-relevant practices within CAP Strategic Plans; improved coherence and comparability of biodiversity delivery across participating regions.
- Implementation outcomes: functioning and easy hybrid payment model at scale (action-based core + result-based bonus) with feasible monitoring (remote sensing + in-field checks), demonstrating an operational PES logic within CAP.

- Environmental outcomes: increased deadwood presence, conserved habitat trees, structural diversity and stand heterogeneity; strengthened ecological conditions and resilience over time in priority zones.
- Socio-economic outcomes: improved acceptance of biodiversity-oriented payments among forest owners via predictable support and clear compliance rules.

6.2. Scenario 2: Protecting water resources through watershed-scale PES

This scenario provides a credible and policy-compatible model for basin-scale forest PES that aligns ecological logic, public river-basin governance structures, and financing feasibility within existing water management frameworks and the Water Framework Directive. The goal is to reduce sediment and nutrient loads in the water (water quality), and to stabilise water flows (water quantity) through better land and forest management in targeted sub-basins. As these benefits accrue to multiple downstream users and public authorities, a publicly anchored PES model with potential co-financing from utilities or basin actors is institutionally coherent and economically justified. Because water outcomes are influenced by weather variability, time lags and upstream activities outside the contracts, the scheme is not designed as a strict results-only contract. Instead, it uses a hybrid design: action-based payments for verified upstream measures known to reduce risk (for example, riparian buffers, erosion control practices, forest cover maintenance, soil-protecting management), and results-based payments based on water quality and quantity modelling. Funding is a mix: public funding supports basin objectives and coordination, while downstream beneficiaries (e.g. utilities) co-finance where cost savings are plausible. Monitoring combines compliance checks with water-quality and hydrological indicators (e.g., turbidity and nutrient concentrations, flow variability/retention effects) at already established abstraction points or downstream control stations, supported by model-based interpretation to avoid penalising land managers for storm-driven spikes outside contract control.

This scenario is consistent with European experience and the Water Framework Directive, where watershed-related PES mechanisms are among the most mature and durable PES configurations, particularly when embedded in river basin planning and supported by actors with stable revenue streams. At the same time, the design acknowledges the well-documented attribution challenges in hydrological systems and therefore avoids relying on strict results-only payment structures.

Table 3 lists which options are selected to fit with the scenario, along the seven PES design themes.

Table 3. Recommended options for scenario 2 (Paying for watershed protection through basin-scale forest management)

Theme	Recommended Option
1. Forest ecosystem services targeted	Regulation of water quality and flow through forest management (<i>CICES: Regulation & Maintenance</i> → <i>Hydrological cycle regulation and water purification</i>), this includes specific ecosystem services such as sediment reduction, nutrient load reduction, peak-flow attenuation and stabilisation of dry-season flows).
2. Temporal framework	Long-term contracts (10–20 years) aligned with river basin management planning cycles under the Water Framework Directive (WFD) and the slow response time of watershed quality and flow on land and forest management changes.
3. Geographical scope	Upstream forest areas within high-risk river basins with sediment, nutrient, or flow-regulation pressures (including, but not limited to, drinking-water relevance), including transboundary catchments where coordination is needed. Crossing administrative boundaries where needed.

4. Financial mechanism	Public-private: national or regional state aid schemes (or European funding through LIFE or Interreg) & co-financing from water utilities through regulated tariffs or water charges. The benefits generated by the scheme are mixed: public (or common) benefits include strengthened ecosystem conditions (including improved biodiversity), better flood regulation, compliance with river basin objectives and European legislation; while (semi-)private downstream water users benefit through reduced costs for water treatment, water flow regulation and sediment reduction.
5. Implementation Control Systems (MRV)	Water quality indicators (e.g. turbidity, nutrient concentrations), hydrological indicators (e.g. flow variability, retention effects), monitoring at water abstraction points or downstream control stations, model-supported interpretation of upstream management effects. Much of this data is already collected for other monitoring and reporting purposes, which leads to an efficient and cheap monitoring framework. As this data is not attributable to specific forests, in-field verification of the contracted investments and measures has to be included as well.
6. Payment design	Hybrid: action-based payments for agreed management practices + result-based bonus/component informed by monitoring and modelling.
7. Promotion and Facilitation Mechanisms within financial programme	Incorporation into regional and cohesion funding programmes through priority objectives for nature-based water protection measures, incentives for participation of upstream land managers, facilitation of partnerships between utilities and landowners. Also embedding in river basin governance and management programmes is a necessity, as these provide existing coordination mechanisms, reducing the operational and transaction costs of the PES scheme.

Stakeholder feedback

Workshop participants stressed the need for more communication towards the beneficiaries of the ecosystem services, as this could strengthen the willingness to participate in the scheme as an ecosystem services buyer. They stressed that the coordination and monitoring are complex (and as such expensive). They also stressed the need for legal regulations for improving water quality and ecological conditions.

Who benefits?

- Forest owners/land managers: long-term payments for forest management and forest structural improvements that contribute to improved watershed functioning.
- Regional and basin authorities: improved water and flow regulation, sediment and nutrient control, and flood-risk mitigation.
- Water users / downstream communities: improved water quality and reduced flood and drought related risks.
- Public programmes/infrastructure operators: lower long-term costs from erosion, sedimentation, and hydrological instability.

Expected outcomes

- Policy outcomes: basin-level progress on WFD indicators (sediment, nutrients, hydromorphological stress) through targeted upstream interventions; stronger integration of PES-style contracts into basin planning instruments.

- Implementation outcomes: workable hybrid design that uses monitoring and modelling to interpret water indicators which can be impacted by extreme events and external activities; improved coordination among multiple land managers and funders.
- Environmental outcomes: reduced erosion risk, improved infiltration and buffer function, reduced peak runoff, improved long-term trends in key water-quality indicators (interpreted over multi-year time frames).
- Socio-economic outcomes: reduced long-term treatment/sedimentation costs where prevention is effective; increased resilience of water services under climate variability.

6.3. Scenario 3: Paying for verified forest carbon removals

As the European Union moves toward climate neutrality, increasing removals in the land sector has become a clear policy objective. However, forest carbon schemes face persistent concerns regarding baselines, additionality, permanence and monitoring integrity. For this reason, this scenario is anchored in a certification-based, policy-aligned framework rather than relying on the loosely regulated voluntary market expansion. Scenario 3 provides a high-integrity, policy-compatible pathway for integrating forest carbon PES into emerging European certification and climate-accounting frameworks, without compromising environmental credibility and durability criteria. The scenario is in line with the EU's Carbon Removals and Carbon Farming certification framework (CRCF).

The objective is to generate removals that are transparent and verifiable by addressing additionality (benefits beyond business-as-usual), credible baselines and permanence (managing reversal risk from fire, pests, or management change). Because benefits accrue over time, the payment mechanism is hybrid: action-based payments support upfront costs, while results-based payments are linked to verified net removals and durable storage over time, with buffer arrangements to address non-permanence risk. Intermediate payments linked to milestones can be added to the payment design, as the contracts in this scenario include long timeframes.

Funding follows a public–private rationale. Public climate finance can provide an anchor and reduce early-stage risk, while private demand for certified removals can co-finance payments as the methodologies and market confidence mature. Monitoring combines project documentation, remote sensing and field data with third-party verification and long-term follow-up, so payments remain conditional on verified performance rather than assumptions.

Table 4 lists which options are selected to fit with the scenario, along the seven PES design themes.

Table 4. Recommended options of scenario 3 (Paying for verified forest carbon removals)

Theme	Recommended Option
1. Forest ecosystem services targeted	Climate regulation through long-term carbon sequestration and storage (CICES: <i>Regulation & Maintenance</i> → <i>Global climate regulation by reduction of greenhouse gas concentrations</i>)
2. Temporal framework	Long-term permanence commitments (20–50 years) with periodic verification of carbon storage and risk management over time, as carbon removals only contribute credibly to climate mitigation if storage is durable and permanent.
3. Geographical scope	European Union-wide application, with region-specific mitigation practices reflecting ecological conditions and land-use suitability. Scope can be local, regional or national for operational, governance, regulation or funding reasons.

4. Financial mechanism	Public-private: European Union climate instrument (Innovation Fund) + compliance/market demand from emissions trading system actors purchasing certified removals (compliance or regulated buyers include operators of energy-intensive digital-asset activities) + risk buffer reserve for non-permanence (e.g., pooled buffer credits).
5. Implementation Control Systems (MRV)	Carbon accounting and verification aligned with the Carbon Removal Certification Framework, including: standardised carbon accounting consistent with land-use reporting systems, biomass estimation using remote sensing and ground data, risk management and mitigation mechanisms (e.g. buffer pools for reversals).
6. Payment design	Hybrid: action-based payments to cover establishment and restoration costs + results-based payments linked to verified tonnes of carbon dioxide removed and stored, based on credible baselines and clear payment triggers. Intermediate payments based on milestones or intermediate results can be added due to the long timeframe covered by this scenario.
7. Promotion and Facilitation Mechanisms within financial programme	Promotion through carbon-related funding instruments by: recognition of certified carbon removals (CRCF) as eligible climate investments, financial instruments facilitating upfront investment (e.g. loans or guarantees from European investment institutions), guidance for participation of regulated emitters and voluntary buyers, while avoiding greenwashing through ethical safeguards.

Stakeholder feedback

Participants to the workshops raised concerns about additionality, how to define the baselines, and the need for transparency for avoiding greenwashing.

Who benefits?

- Forest owners/land managers: long-term income from verified carbon removals and storage.
- Private buyers / regulated emitters: access to certified, high-integrity carbon removals.
- European Union and Member State climate policy: additional and certified removals aligned with climate targets and accounting systems.
- Citizen/society: lower net greenhouse gas emissions and more climate-resilient landscapes.

Expected outcomes

- Policy outcomes: increased deployment of certified removal activities consistent with emerging EU certification requirements; improved integrity/credibility of forest carbon claims through baseline-setting, verification, and permanence safeguards.
- Implementation outcomes: demonstration of a financing structure that overcomes long timelines (action-based payments, intermediate payments, and results-based payments) and manages reversal risk (buffers/risk pooling).
- Environmental outcomes: verified net carbon storage improvements beyond business-as-usual baselines (where robustly defined), plus resilience-oriented practices that reduce reversal risk.
- Socio-economic outcomes: strengthened trust and transparency through registries, third-party verification and standardised methodologies.

6.4. Scenario 4: Paying for climate resilience and fire risk reduction

Scenario 4 demonstrates how PES can support prevention-oriented, climate-resilience forest and land management in fire-prone landscapes through a realistic, policy-compatible payment and monitoring framework.

Wildfire risk reduction is fundamentally a public-good function: benefits such as reduced damage to communities and infrastructure, lower suppression and recovery costs, and improved landscape resilience are widely shared, while private incentives for preventive management are often insufficient. This makes a publicly financed PES approach a realistic and policy-relevant option for scaling preventive action. By design, the scenario focuses on verifiable risk-reduction conditions (fuel reduction, maintained fuel breaks, strategic mosaics, vegetation structures that slow fire spread and intensity) rather than event-based outcomes such as “fires avoided” which are strongly influenced by weather and external factors beyond the control of individual land managers.

Funding is primarily public because the benefits are widely shared: fewer disasters, protected infrastructure, safer communities, and reduced emergency costs. Optional European Union co-financing can support pilots or scaling through climate adaptation funding. Monitoring focuses on fuel- and structure-related indicators and verified maintenance, supported by remote sensing and targeted site inspections.

Table 5 lists which options are selected to fit with the scenario, along the seven PES design themes.

Table 5. Recommended options of scenario 4 (Paying for climate resilience and forest wildfire risk reduction)

Theme	Recommended Option
1. Forest ecosystem services targeted	Regulation of disturbance impacts through reduction of wildfire spread potential (<i>CICES: Regulation & Maintenance</i> → <i>Mediation of extreme events</i>), while avoiding a decline in biodiversity.
2. Temporal framework	Medium-term commitments (5–10 years), with periodic review of compliance and landscape risk conditions, as frequent maintenance is needed to keep the vegetation in a condition that limits wildfire spread, while still keeping flexibility to be able to adapt to changing conditions and management constraints and requirements (e.g. due to new infrastructure). A longer-term outlook can be realised by situating the contracts in forest management planning processes.
3. Geographical scope	Regions with high wildfire hazard, particularly wildland–urban interface (WUI) zones and areas identified through national, regional or local fire risk assessments. Next to forests, this should also include other land use, for example to avoid land abandonment.
4. Financial mechanism	Public (state aid): national or regional public programmes for risk prevention and climate adaptation, potentially complemented by EU co-financing instruments (e.g. Pillar II measures + LIFE adaptation grants). The focus on public funding only, is due to the high public cost reduction (avoided costs towards communities, infrastructure, ecosystems; but also avoided costs for fire combatting). As the risk to single private ecosystem service buyers is low and/or difficult to attribute, the scenario is public funding only.

5. Implementation Control Systems (MRV)	Verification based on implementation of strategic preventive measures and landscape conditions, including: assessment of fuel reduction in priority locations (e.g. firebreak zones, buffers near settlements, high-risk spread pathways), verification of compliance with approved fuel management plans, remote sensing to monitor vegetation density and land-cover changes, confirmation of timing of interventions relative to fire season, on-site verification of implemented measures, use of fire risk assessment tools (e.g. waldbrand.at) where available.
6. Payment design	Action-based, with risk-reduction performance bonuses (results-based), rewarding implementation and maintenance of preventive measures that reduce fire spread potential rather than fire occurrence. This is a more fair design compared to looking at fire occurrences, as ignition and fire spread due to exogenous conditions are out of the control of the ecosystem service provider or forest manager enrolled in the scheme.
7. Promotion and Facilitation Mechanisms within financial programme	Incorporation into public funding schemes through: dedicated funding windows for preventive landscape management, incentives for coordinated participation across neighbouring land managers, support for collective applications where landscape-scale action is required, alignment with national wildfire risk management strategies. Awareness raising with the general public and forest/land managers, and training of forest and land managers is crucial for effective fire prevention.

Stakeholder feedback

Participants to the workshop suggested expanding the focus beyond forests, to also include unmanaged land (with or without woody biomass), where wildfires ignite or spread quickly. They also suggest strengthening the link with long-term wildfire prevention planning (with timeframes beyond 10 years), e.g. through linking the PES scheme with forest management planning. The financial compensation should be high enough to compensate for the loss of income (for instance when replacing conifers with broad-leaved trees). Training forest managers on fire and fire prevention and raising their awareness on the risks is also a necessity. Finally, the participants indicated that fire prevention should not result in a reduced biodiversity (e.g. by removing the understory or deadwood).

Who benefits?

- Forest owners/land managers: support for preventive forest management that is costly but publicly beneficial.
- Local communities (especially in high-risk areas): reduced wildfire spread risk and lower exposure to damage.
- Public authorities / civil protection systems: lower long-term suppression and recovery costs.
- Infrastructure operators and local economies: reduced disruption and damage risk in fire-prone regions.

Expected outcomes

- Policy outcomes: measurable reduction in hazard indicators in targeted zones; improved alignment of forest management incentives with EU resilience/prevention framing.
- Implementation outcomes: workable scheme that avoids unfair “fire outcome” conditionality by paying for verifiable risk-reduction actions and condition-based bonuses (not “no-fire” results).
- Environmental outcomes: reduced fuel continuity and hazardous biomass accumulation; more fire-resilient landscape structures and strategic treated areas maintained over time.

- Socio-economic outcomes: reduced long-term public costs from extreme fire events (suppression, recovery, infrastructure losses) where prevention is sustained and well targeted.

6.5. Scenario 5: Paying for urban cooling and well-being through urban and peri-urban forest PES

Scenario 5 addresses a rapidly growing European policy challenge: urban heat exposure and unequal access to high-quality green space, with direct implications for climate adaptation, health, and social equity. Funding follows a public–private rationale. European Union cohesion and urban funding (e.g. Social Climate Fund) can provide capital support for establishing or upgrading green infrastructure, while municipal budgets finance ongoing management and maintenance. Private funding by businesses, citizens, associations or estate developers (voluntarily or mandatory) can complement the funding. The scenario demonstrates how PES-style management contracts can (co-)fund ongoing management and maintenance of urban and peri-urban forests, watering, pruning, safety, replacement planting, and maintaining access, because this is where many cities face a chronic funding gap. Urban societies can also contribute to the management of surrounding peri-urban and rural forests that also contribute to the liveability and wellbeing of the city.

Monitoring focuses on locally attributable service delivery, combining canopy cover and vegetation condition indicators, neighbourhood heat-exposure measures, accessibility and use indicators, and on-site verification of maintenance actions. Air-quality metrics can be included only where local attribution to urban nature is plausible (e.g., roadside corridors), but they are not the main payment trigger. Many of these indicators are already monitored for other purposes (including reporting on greenspace management, urban environmental quality), are available from municipal GIS data, or are available from Copernicus or OpenStreetMap data.

A sustainable PES model for urban and peri-urban forests delivers urban canopy where it matters most, measurable reduction in local heat exposure, improved access for vulnerable residents, and a practical model that converts greening projects into sustained public services. This model is relevant for funding the implementation of Urban Nature Plans, as defined in the European Biodiversity Strategy and the Nature Restoration Regulation, and Urban Adaptation Plans. Awareness raising with citizens and decision-makers on the role of forests and trees for urban liveability is important for this scenario, and can result in a higher willingness to contribute to the PES scheme.

Table 6 lists which options are selected to fit with the scenario, along the seven PES design themes.

Table 6. Recommended options of scenario 5 (Paying for urban cooling and well-being through urban and peri-urban forests)

Theme	Recommended Option
1. Forest ecosystem services targeted	Local climate regulation (cooling) with co-benefit physical/psychological well-being enabled by urban green infrastructure (CICES: Regulation & Maintenance → Micro- and local climate regulation, air quality regulation where local attribution is plausible; and Cultural → Physical and experiential interactions with the environment). Having access to urban greenspace is an important enabler for improving human health and well-being, but also inaccessible green has a positive impact on urban cooling.
2. Temporal framework	Medium-term delivery timescale aligned with EU urban programming periods (e.g. 2026–2032) with ongoing annual or multi-annual management contracts.
3. Geographical scope	Urban and peri-urban forests and green corridors, with priority for heat-stress hotspots (biophysical targeting), neighbourhoods with higher vulnerability (socio-economic targeting) and/or neighbourhoods with limited

	access to urban greenspace. Highest priorities go to locations where the three mentioned criteria apply. Potentially expanding to surrounding rural forests.
4. Financial mechanism	Public–private: European Union cohesion/urban funding as capital support + municipal budgets for ongoing management + citizen or business sponsorships + developer contributions/planning-related levies (where available under national or municipal rules) earmarked for green infrastructure and maintenance.
5. Implementation Control Systems (MRV)	Verification focused on high-attribution, low-noise indicators combining one or more of the following indicators: canopy cover and vegetation condition (remote sensing + on-site verification), accessibility and use indicators (e.g. proximity, access points, maintenance standards; optional visitor counts), on-site verification of management and maintenance action.
6. Payment design	Action-based, providing payments for ongoing management and maintenance of urban and peri-urban forests, complementing capital funding for green infrastructure establishment where relevant.
7. Promotion and Facilitation Mechanisms within financial programme	Alignment with Sustainable Urban Development strategies supported under cohesion policy; integration into municipal climate adaptation, health, urban nature and urban resilience plans; dissemination of guidance, case studies, and tools through European urban policy networks and partnerships (e.g. Greening Cities Partnership, European Urban Initiative, ESPON, ICLEI); capacity-building and knowledge exchange supporting cities in designing and implementing PES-style maintenance contracts; facilitating exchange between urban actors and foresters; increasing awareness on the role of forests and trees for urban wellbeing and liveability.

Stakeholder feedback

Participants in the workshop indicated that this scenario could be developed in a scheme that strengthens rural-urban alliances, where cities and their inhabitants co-fund investments in the peri-urban and rural areas surrounding the city. Risks identified included the establishment of the baselines, the missing relations between cities and forest managers, measuring the results and the lack of involvement of citizens in the scheme. On the other hand, they identified a high willingness by citizens and politicians to limit the impact of heatwaves, and to contribute to urban nature in general. Participants also suggested extending the timelines of the scenario, as longer-term management and maintenance horizons are needed to deliver high-quality urban nature.

Who benefits?

- Urban residents (especially in vulnerable neighbourhoods): cooler environments, improved access to green space, and health/well-being benefits.
- Municipalities / urban authorities: support for climate adaptation and public health objectives; increased budget for greenspace management and maintenance.
- Peri-urban forest owners/land managers: compensation for ongoing management that provides public and common benefits.
- Public health systems / local services: reduced heat-related interventions and mortality, reduced stress levels and improved urban liveability.

Expected outcomes



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- Policy outcomes: improved delivery of urban climate adaptation objectives with measurable neighbourhood-scale indicators (heat exposure, canopy condition, accessibility); better equity targeting (mainly towards vulnerable areas).
- Implementation outcomes: a PES-compatible model that separates capital investment from long-term maintenance payments; control system combining ecological condition plus human-benefit indicators, supported by existing urban monitoring frameworks.
- Environmental outcomes: maintained or increased canopy cover in priority zones; improved vegetation condition; sustained cooling performance.
- Socio-economic outcomes: improved access to well-maintained green areas; stronger local resilience during heatwaves; reduced vulnerability to heat stress; clearer accountability for long-term maintenance performance.

6.6. Scenario 6: Integrated landscape PES for bundled ecosystem services

Scenario 6 provides a policy-compatible model for bundled, landscape-scale forest PES in contexts where coordinated management is necessary to achieve meaningful ecological outcomes. In many European forest contexts, fragmented ownership and parcel-based contracting reduce ecological effectiveness, particularly where services such as habitat connectivity, watershed protection, and landscape-scale carbon storage depend on coordinated action across multiple properties. A change in forest structure might improve habitat and water retention while also influencing carbon stocks. But if programmes pay for each service separately, landowners face fragmented incentives, trade-offs go unmanaged, and the landscape never adds up to a coherent result.

This scenario was retained because evidence and workshop discussions consistently highlighted the need for more integrated, place-based PES configurations that can contract multiple primary ecosystem services jointly rather than treating one service as dominant and the others as incidental co-benefits. An integrated PES scheme can make it possible to recognise values across a wider range of ecosystems, and include spaces that would be overlooked by single ES focus. By structuring payments at the landscape scale and supporting collective participation mechanisms, the design seeks to overcome coordination barriers while maintaining service-specific accountability and lower transaction costs. Furthermore, a landscape approach can also be interesting from a marketing perspective by generating a sense of belonging and local added value.

The scheme is hybrid and collective: action-based payments support coordinated management measures, complemented by results-based bonuses linked to agreed landscape-scale indicators, with distribution rules and layered incentives agreed among participants. A pure results-based scheme would be too complex and risky with multiple services and land managers involved (and the associated difficulties to attribute results to specific land managers), while a pure action-based scheme would weaken the scheme credibility.

The funding follows a public–private rationale: public funding provides the baseline for coordination and participation (including support for intermediary/coordinating bodies and technical assistance), while service-specific co-financing can be layered where beneficiaries exist (for example, utilities for water benefits, certified carbon buyers for climate benefits). Monitoring avoids a single “one-number” score; instead, it uses service-specific indicators supported by remote sensing and on-site verification, aggregated into landscape reporting so conditionality remains clear, and trade-offs are visible, similarly proxies can be used to make monitoring less complex and intensive. This preserves service-specific accountability while allowing landscape-level reporting and programme management, reducing overall monitoring costs.

Table 7 lists which options are selected to fit with the scenario, along the seven PES design themes.

Table 7. Recommended options of scenario 6 (Paying for bundled forest ecosystem services at landscape scale)

Theme	Recommended Option
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1. Forest ecosystem services targeted	Bundled primary services: habitat and gene pool protection + hydrological cycle regulation and water purification + global climate regulation - the aim of the bundle is to maximise synergies while reducing trade-offs between these and other ecosystem services. <i>(CICES: Regulation & Maintenance → lifecycle maintenance and habitat protection, hydrological cycle regulation, global climate regulation).</i>
2. Temporal framework	Medium-term (5–10-year) landscape contracts, with periodic review and adaptive management provisions. This allows for observing impacts that happen after longer time, while keeping flexibility for adjusting to changing conditions (ecological conditions, funding opportunities, legal framework, stakeholder participation). A phased approach can be used, within a longer time perspective, where additional ecosystem services are added when the scheme gets more mature.
3. Geographical scope	Functionally defined forest landscapes where coordinated management influences multiple services, such as: Natura 2000 complexes, mountain regions, forest watersheds or river sub-basins, cross-border forest landscapes.
4. Financial mechanism	Public–private: public funding for baseline collective management and coordination (e.g. European, national or regional rural development cooperation instruments such as CAP Pillar II, LEADER project or community-led approaches) as baseline service-specific co-financing by identifiable beneficiaries (e.g. utilities, carbon buyers, tourism stakeholders) where applicable.
5. Implementation Control Systems (MRV)	Service-specific monitoring combined at landscape scale: ES indicators (e.g. habitat condition, watershed indicators, carbon metrics), remote sensing for land-cover and structural changes, on-site verification of agreed management actions across participating land units, proxy indicators, aggregated reporting of outcomes, programme accountability, while reporting per ecosystem service is still possible.
6. Payment design	Hybrid (collective): action-based payments for collaborative management measures + results-based bonuses linked to landscape-scale service indicators, with payments distributed to participants based on agreed rules including layered incentives (not based on results).
7. Promotion and Facilitation Mechanisms within financial programme	Support for landscape-scale coordination: funding for intermediary organisations coordinating bodies, technical assistance for collective planning and application of simplified procedures for group participation, incentives for cooperation among neighbouring land managers.

Stakeholder feedback

Participants to the workshops stressed marketing opportunities for integrated PES schemes at the local level, building on a sense of uniqueness and local added value. Such an approach can support economic regeneration of an area. However, participants also identified the complexity of the integrated system as a risk. Another risk identified is that the different beneficiaries receive different payments, and even with these payments being justified along the internal regulations, tensions between stakeholders can happen. For monitoring, the use of proxies has been suggested. Participants also suggested longer timeframes, and a long-term path for PES for integrated landscape management, with expanding the ecosystem services or increasing the ambition at the longer term. Credibility, trust, transparency, clarity and reputation have been identified by the participants as crucial for successful implementation.

Who benefits?

- Forest owners and other land managers participating collectively: access to payments that depend on coordination and landscape scale.
- Local and regional authorities: more efficient delivery of biodiversity, watershed, and climate objectives through integrated management.
- Identifiable service beneficiaries (where applicable): e.g., water utilities, carbon buyers, tourism actors benefiting from improved landscape functions.
- Rural communities and landscapes: stronger cooperation, reduced fragmentation, and improved multifunctionality.

Expected outcomes

- Policy outcomes: demonstrable multi-service delivery in selected functional landscapes; stronger coherence across biodiversity, water and climate policy goals where services are interdependent.
- Implementation outcomes: collective hybrid design with layered finance (public baseline plus service-specific co-financing) and service-specific indicators aggregated at landscape scale (avoiding a single composite score that weakens conditionality).
- Environmental outcomes: combined improvements in habitat condition, watershed function, and carbon storage trends (interpreted per service); reduced trade-offs through explicit planning and monitoring.
- Socio-economic outcomes: strengthened cooperation and trust among participating land managers; reduced individual transaction costs (via intermediaries and group applications); improved perceived fairness and local legitimacy of environmental payments where distribution rules are transparent; potential local employment/skills benefits linked to coordinated planning, monitoring, and management activities.

6.7. Scenario 7: Securing drinking water at its source through utility-led PES

Scenario 7 illustrates a targeted and governance-compatible utility-led PES pathway for drinking-water source protection through upstream land management, one of the most policy-relevant and potentially durable PES configurations in the European context, and being in line with the European Drinking Water Directive.

Scenario 7 is anchored in specific source catchments linked to defined drinking-water systems, where a clearly identifiable beneficiary - the water utility - has direct financial and regulatory incentives to invest in upstream protection measures. Project discussions and earlier findings highlighted that utilities across Europe face rising treatment complexity, compliance pressures, and long-term supply risks, while preventive catchment management can often be more cost-effective and durable than relying solely on downstream treatment technologies. This creates a strong and economically grounded “beneficiary pays” logic. In this scenario, utilities are not peripheral co-funders but structured anchor payers within a formalised PES arrangement, complemented by public support where broader public-good elements are involved.

This scenario is a utility-led PES model for source protection with one anchor payer. The utility (or drinking-water provider) acts as the primary payer, using regulated tariffs or service charges, because it directly benefits from better raw water conditions. Land managers upstream are paid to maintain protective conditions: forest cover, riparian buffers, erosion control, reduced chemical inputs where relevant, and practices that stabilise runoff. Because water indicators can be impacted by external one-off events, the scheme is hybrid. It pays mainly for verified actions and compliance, and uses results-based components only where attribution is plausible (for example, at targeted monitoring points interpreted with modelling).

Funding is public–private: utility revenues are primary, complemented by targeted public co-funding for restoration and monitoring capacity where broader public benefits apply. Monitoring verifies the agreed measures and tracks key raw-water indicators at abstraction points, supported by upstream sampling,

remote sensing of land cover and buffer integrity, and modelling to interpret trends and external influences. Such a monitoring approach mainly uses existing monitoring infrastructure.

Table 8 lists which options are selected to fit with the scenario, along the seven PES design themes.

Table 8. Recommended options of scenario 7 (Paying for drinking water source protection through utility-led PES)

Theme	Recommended Option
1. Forest ecosystem services targeted	Watershed protection for drinking-water supply enabled by forest cover, low-input management, erosion control, and riparian buffering. (CICES: <i>Regulation & Maintenance</i> → <i>Regulation of the chemical condition of freshwaters (water quality regulation)</i>)
2. Temporal framework	Long-term contracts (10–30 years) aligned with drinking-water infrastructure planning and utility asset cycles, with periodic compliance and performance reviews. Shorter term contracts can be used to make actors familiar with the concept, followed by longer-term contracts.
3. Geographical scope	Upstream source catchments supplying major drinking-water systems, including protected abstraction zones.
4. Financial mechanism	Public–private: utility tariffs/service charges as primary funding + targeted public co-funding for restoration and monitoring capacity (EU or national programmes (Interreg/LIFE)).
5. Implementation Control Systems (MRV)	Compliance monitoring of agreed land-management measures combined with targeted water-quality indicators (nitrate and pesticide concentrations at abstraction points, turbidity and sediment load indicators) + periodic upstream sampling at representative locations + remote sensing to verify land cover and buffer integrity + hydrological or water-quality modelling to interpret trends and external influences.
6. Payment design	Hybrid: action-based payments for agreed watershed protection measures + results-based components linked to raw water quality outcomes at abstraction points where attribution is feasible.
7. Promotion and Facilitation Mechanisms within financial programme	Integration into drinking-water source protection planning and regulatory frameworks (primarily the recast Drinking Water Directive risk-based approach, with WFD coordination where relevant), utility–landowner coordination mechanisms and advisory support, technical guidance on watershed protection measures, model long-term contract structures to reduce transaction costs, capacity support for monitoring and data management.

Stakeholder feedback

Participants in the workshop indicated that this setup allows going beyond minimum legal requirements, if needed or expected by the water company. They suggested starting with shorter term contracts, so the ecosystem service providers can get familiar with the system, followed by longer-term contracts. Not every land manager thinks similarly, so flexibility in contracts and their terms may be needed: some prefer longer-term stability with constant and predictable income streams, others want to be able to adapt to conditions. This scenario has also been suggested as being in line with the ESG requirements for businesses, although monitoring and reporting have to be finetuned to be in line with ESG reporting.

Who benefits?

- Water utilities / drinking-water providers: lower treatment costs, reduced operational risk, and more secure raw water quality.
- Forest owners/land managers: stable long-term payments for source protection measures that may otherwise reduce income from timber production.
- Citizens/society: safer drinking water supply and greater resilience of public water services.
- Public authorities: progress on source protection and water policy objectives, reduced environmental risks to critical infrastructure, and co-benefits for other reservoir functions where applicable, supported through targeted co-funding rather than full public financing.

Expected outcomes

- Policy outcomes: improved preventive source-protection outcomes in designated catchments; clearer operational linkages between land management contracts and drinking-water risk management frameworks.
- Implementation outcomes: a realistic hybrid contract model combining action-based payments with results-based components only where attribution is plausible; improved trust via monitoring plus modelling.
- Environmental outcomes: reduced erosion and pollutant risk in source catchments; strengthened riparian function and buffer integrity; improved multi-year trends in key raw-water risk indicators (interpreted with context).
- Socio-economic outcomes: reduced long-term treatment and risk-management costs; improved reliability of public water services and reduced vulnerability to contamination episodes.

6.8. Cross-scenario comparison

To complement the individual presentation of the seven scenarios, this section and Table 9 provides a cross-scenario comparison of the recommended options across the seven common design themes used in this deliverable. While the previous subsections described each scenario as a coherent PES configuration in its own right, the matrix below allows a more systematic comparison of how the scenarios differ in terms of ecosystem service focus, temporal framework, geographical scope, financial architecture, implementation control systems, programme type, and promotion and facilitation mechanisms. In this way, the comparison helps to make both the common structure and the main points of variation across the scenario set more explicit.

Taken together, the comparison matrix highlights that the seven scenarios are built on a shared methodological structure, but represent clearly differentiated pathways for integrating PES into EU funding programmes. Some scenarios rely on existing large-scale EU instruments, others on territorially targeted or sector-specific arrangements; some favour public funding anchors, while others combine public and private finance; and some are based on individual contractual logic, whereas others depend on coordination at landscape or catchment level.

Table 9. Cross-scenario comparison matrix of recommended options across the seven design themes

Design theme	S1 Biodiversity / CAP	S2 Basin-scale watershed	S3 Carbon removals	S4 Wildfire risk reduction	S5 Urban cooling & well-being	S6 Bundled landscape-scale services	S7 Utility-led drinking-water protection
1. Forest ecosystem services targeted	Biodiversity: habitats and gene pool protection	Water quality and flow regulation	Climate regulation through long-term carbon sequestration and storage	Regulation of disturbance impacts through reduced wildfire spread potential	Local climate regulation with well-being co-benefits	Bundled services: biodiversity + water regulation + climate regulation	Watershed protection for drinking-water supply
2. Temporal framework	Medium term: 5–7 years , aligned with CAP cycles, periodic review	Long term: 10–20 years , aligned with WFD basin planning cycles	Long term: 20–50 years , with permanence and verification requirements	Medium term: 5–10 years , with review of compliance and risk conditions, longer-term outlook through forest management plan	Medium term: aligned with urban programming periods, with annual or multi-annual management contracts	Medium term: 5–10 years , with adaptive review; phased approach possible (additional ES and/or higher ambition when scheme gets more mature)	Long term: 10–30 years , aligned with utility planning and asset cycles
3. Geographical scope	Natura 2000 sites and priority biodiversity hotspots, can be expanded to unprotected areas	Upstream forest areas in high-risk river basins, including transboundary catchments	EU-wide, with region-specific mitigation practices	High wildfire hazard regions, especially WUI zones; also abandoned land	Urban and peri-urban forests / green corridors, prioritising heat hotspots and vulnerable neighbourhoods; potentially also surrounding rural forests	Functionally defined forest landscapes: Natura 2000 complexes, mountain regions, watersheds, cross-border landscapes	Upstream source catchments supplying major drinking-water systems, including protected abstraction zones

4. Financial framework	EU public funding only: CAP Pillar I eco-schemes	Public–private: State aid + water utility co-financing	Public–private: EU climate instrument + regulated/compliance carbon buyers + buffer reserve	Public public/state aid , with possible EU co-financing	Public–private: EU cohesion/urban funding + municipal budgets + citizen/business sponsorships + developer/planning contributions	Public–private: EU/national baseline funding + service-specific beneficiary co-financing	Public–private: utility tariffs/service charges + targeted public co-funding
5. Implementation control systems (MRV)	Habitat-quality indicators, remote sensing, on-site verification, CAP checks	Water-quality and hydrological indicators, monitoring stations, modelling	CRCF-aligned carbon accounting, remote sensing, ground data, reversal-risk buffers	Verification of preventive measures, remote sensing, on-site checks, fire-risk tools	Canopy/vegetation condition, accessibility/use indicators, on-site checks	Service-specific indicators combined at landscape scale, remote sensing, on-site checks, proxies, aggregated reporting	Compliance monitoring, water-quality indicators at abstraction points, upstream sampling, remote sensing, modelling
6. Payment design	Hybrid: action-based base + ecological performance bonus	Hybrid: action-based practices + result-informed bonus	Hybrid: upfront/milestone support + results-based payments for verified removals	Action-based with risk-reduction performance bonuses	Action-based management and maintenance payments	Hybrid collective: coordinated action-based payments + landscape-scale results bonuses & layered incentives	Hybrid: action-based payments + results-based elements where attribution is feasible
7. Promotion and facilitation mechanisms	CAP Strategic Plan integration, EU guidance, Member State tools, advisory/intermediary support, collective options, connect with forest certification and forest management planning	Regional/cohesion programme integration, incentives for upstream participation, utility–landowner partnerships	CRCF recognition, financial instruments for upfront investment, guidance for buyers and emitters, ethical safeguards to avoid greenwashing	Dedicated prevention funding windows, incentives for coordinated participation, collective applications, alignment with wildfire strategies	Integration with urban adaptation/health/resilience plans, urban policy networks, capacity-building	Funding for coordinating bodies, technical assistance, simplified group procedures, incentives for cooperation	Integration into drinking-water source protection planning, utility–landowner coordination, technical guidance, model contracts, monitoring/data support

7. Policy recommendations for better integrating PES in European funding instruments

The following builds on recommendations and clarifications drawn from the wider ProForPES evidence base, including D2.2 (Nazari et al. 2024), D2.3 (Brusa et al. 2024), D3.1 (Corradini et al. 2025), D4.1 (Nazari & Vacik 2026), and the Task 4.1 recommendations matrix (revised version in section 8). The resulting set of twelve tangible recommendations remains aligned with the EU Forest Strategy, while adding new elements on programme financing, design, targeting, policy integration, and implementation. The recommendations provided could be adapted across policy settings, including CAP-based biodiversity measures, CRCF-linked carbon removals, watershed and drinking-water PES, and urban or territorial schemes.

7.1. PES Framework and Future EU funding programmes

The ProForPES project found evidence that PES uptake in Europe is constrained not only by lack of funding, but also by transaction costs, administrative burden, fragmented governance, legal uncertainty, weak monitoring arrangements, and uneven understanding of the PES concept. Conversely, the project also identified PES enabling conditions such as growing environmental awareness and increased willingness to invest by citizens and corporates, institutional legitimacy, interest in nature-based solutions, and opportunities to align PES with existing EU policies and programmes.

Future EU funding programmes should preferably treat PES not as a single stand-alone instrument, but as a family of context-dependent mechanisms that need to be designed coherently across seven identified dimensions: targeted ecosystem services, temporal framework, geographical scope, financial framework, payment design, facilitation mechanisms, and implementation control systems. We suggest that this seven dimensional structure provides a practical backbone for integrating PES into EU supported programmes in a transparent and harmonised way. Each dimension offers multiple options, allowing to develop a PES scheme tailored to its operational context.

7.2. Tangible recommendations for future PES schemes

1. Enable legal and funding stability over ecologically meaningful timeframes

Stability and predictability are central for successful PES schemes. Results consistently show that ecological outcomes tend to require several years to develop, while participants also need the confidence that contracts, budgets and rules will not change abruptly. On the other hand, very long contracts are often opposed by landowners seeking to preserve flexibility, and longer-term contracts can limit the possibility to adapt to changing political, social, or ecological contexts. Feedback from the ProForPES project workshops indicates that very short commitments may be too weak to generate ecosystem service outcomes, while very long commitments can deter participation; a practical solution is to combine medium-term contracts with periodic review, and where relevant, align contract duration with forest management planning cycles.

A mid-term timeframe of 5 to 10 years can therefore often be a reasonable reference horizon for PES support – whenever the underlying environmental externality which PES seeks to address is persistent in nature – with options for renewal or phased extension where ecological and social conditions justify it.

BOX The **METSO Forest Biodiversity Programme** in Finland provides a relevant European example based on voluntary participation that allows forest owners to choose between different protection options, including temporary protection, ten-year environmental aid contracts and permanent protection. This design avoids a one-size-fits-all contract length: medium-term commitments can support biodiversity outcomes while preserving landowner flexibility, whereas permanent protection remains available where ecological value and landowner willingness justify longer-term commitments. The case study therefore illustrates how PES-type programmes can combine stability, predictability and voluntary participation through differentiated contract durations.

2. Consider blended finance as a complementary funding model

A blended-finance approach - combining public and private funding - emerged strongly as a preferred PES design feature across ProForPES research activities and stakeholder interaction. Public finance is important for credibility, stability, start-up support, and coverage of transaction and operational costs, while private funding can increase flexibility, leverage innovation and enhance responsiveness to local demand.

BOX A relevant European example is the **BioClima Initiative** in Lombardy, Italy, which uses an innovative public-private funding mechanism combining regional public grants, funding from a philanthropic and grant-making foundation for technical assistance, and private sponsorship raised locally through validated or verified positive-impact claims. By December 2022, around €5.6 million had been invested in 17 projects, with corporate contributions (almost 1.5 million from 54 private companies and organizations) supporting the ecosystem services generated by restored and afforested areas. Complementary European examples point in the same direction: the Waidhofen/Ybbs Water Protection Zone in Austria combines local water-price revenues with EU funding to support water-related ecosystem services, while Rusenski Lom Nature Park in Bulgaria uses a private-public conservation fund linked to tourism revenues to finance park management, habitat restoration and biodiversity protection. Together, these cases illustrate how future PES programmes could combine public core finance, local or sector-based revenues, philanthropic support and private contributions under transparent governance and accounting rules.

Future EU and national financial programmes should therefore allow stable public core finance to be combined with private contributions, including from utilities, companies and other ecosystem service buyers, under clear legal accounting rules and pursuing additionality, and respecting ethical safeguards to avoid greenwashing. To make this workable, financial programmes should simplify co-financing procedures, clarify compatibility with public funding rules, and consider risk-sharing tools, bridge funding, guarantees or similar instruments when these can reduce entry barriers for private co-investment. In practice, this logic should allow for combining CAP and national support, climate and water-related instruments, cohesion-type territorial support, and local or municipal resources, while complying with regulations for state-aid.

3. Use more hybrid-payment (action- and result-based) design in future PES schemes

Strong arguments have been made in the PES and agri-environmental literature for the increased use of result-based financing mechanisms, where payments are conditional on the achievement or maintenance of a measured environmental outcome; the stakeholders consulted by ProForPES generally support these calls. Yet, many environmental services face large fluctuations over time, caused by factors outside landowners' control (weather, climate change, ecological dynamics, disturbances, etc.), implying risks to prospective PES recipients. Hence, the project evidence suggests hybrid payment models to be the most workable and legitimate design for future PES integration. Combining upfront action-based support (conditional on the implementation of agreed management practices or investment) with result-based incentives improves accessibility for landowners, especially smallholders, while linking part of the payment to verified ecological improvement. This strengthens PES credibility and motivates forest managers to deliver the ecosystem services which they have committed to. Internal insurance and guarantee mechanisms may also collectively protect participants in PES schemes against negative consequences from events outside of their control.

In practice, future PES schemes should include clear payment triggers based on transparent indicators on action and environmental outcomes. ProForPES identified a stakeholder preference for a hybrid funding approach, and stakeholders suggested a staged pathway in which additional and more ambitious result-based payments are gradually introduced as the programme develops and capacities and capabilities strengthen over time.

BOX As an example, the **KerryLIFE freshwater pearl mussel conservation project** in Ireland, was structured around a set of practical conservation actions, while critical source areas on participating farms were assessed annually using a five-point ecological scoring system. Areas reaching the required score received result-based payments, and farmers received advice on how to reduce sediment loss and improve ecological condition. This provides a useful example of a staged hybrid payment model, where land

managers receive practical guidance and support on required action while part of the payment logic remains linked to verified ecological performance.

4. Build robust, proportionate MRV systems aligned with existing reporting obligations

Reliable monitoring, reporting and verification (MRV) is essential for credible PES, especially where results-based components are used. ProForPES shows, however, that purely results-based monitoring is not always appropriate or affordable, particularly when ecological outcomes are difficult to attribute to specific interventions or land managers, or when impacts can be affected by external factors (see 3.).

Future financial programmes should therefore facilitate MRV systems that combine one or more of the following methods: field observations, practice-compliance checks, remote sensing, citizen science, modelling, proxy-based monitoring and selective on-site verification, where appropriate. Monitoring should be aligned as far as possible with existing forest certification schemes, forest management plan monitoring and related reporting duties (also those for the Nature Restoration Regulation, Natura 2000 and Water Framework Directive reporting) in order to reduce duplication and transaction costs, while public authorities or trusted intermediaries should retain primary responsibility for the MRV infrastructure and final verification.

BOX. Interreg ECO-SMART, implemented in Natura 2000 sites in Italy and Slovenia developed and tested PES methods, integrating databases, pilot models, adaptation plans, stakeholder agreements, training curricula and harmonised procedures. It illustrates a methodological and data infrastructure that can support more consistent monitoring and reporting across sites. Similarly, BioClima in Lombardy, Italy, combines validated or verified positive-impact claims with sustainable forest management certification and training on procedures for verifying ecosystem service impacts. Taken together, these cases illustrate how MRV systems can combine certification and verification tools that complement field-based evidence, reduce transaction costs and increase credibility.

MRV systems have to be aligned with the focus of the PES scheme, and vice versa when the design of the scheme allows for straightforward monitoring, reporting and verification. Innovative MRV tools such as remote sensing, sensors, AI-assisted analysis and interoperable data systems should be encouraged where they reduce cost and improve consistency, but they should complement rather than replace locally grounded ecological information. Publicly accessible summary data can improve credibility and transparency, provided that sensitive site-level information is appropriately safeguarded. MRV should also support targeted reporting resonating with ecosystem service buyers' interests and needs.

Despite the many variations in MRV frameworks - reflecting the different ecological, landscape, economic, social and governance contexts - European-wide guidance for developing MRV in PES could be developed in the form of a CEN Workshop Agreement, a reference document from the [European Committee for Standardization](#) (CEN). This is a consensus-based normative document that defines criteria where MRV frameworks and baseline descriptions should comply, without aiming to detail the monitoring framework and criteria itself.

5. Improve communication, simplify terminology and invest in awareness raising

A recurring finding of the ProForPES project is that PES terminology is not equally understood and is often too technical for broader uptake amongst landowners, policymakers, businesses and the general public. Awareness of ecosystem services and the potential contribution of forest owners remains limited, which also tends to weaken participation in, and political support for PES schemes.

Future PES scheme design and implementation should therefore invest in communication strategies tailored to different audiences, combining facts, practical examples, and locally relevant stories of success and to avoid failure. They should also use simpler and more accessible framing and language (avoiding jargon). As many PES-like approaches exist (e.g. carbon credits, biodiversity credits, nature financing), communication should reduce confusion without abandoning conceptual consistency.

Communication in PES schemes should also include education and capacity building with all the actors involved, including the general public.

BOX. The **Love the Forest project** in Sweden is a strong example of an education-oriented approach: it engages elementary school students to imagine the future of forests, connects them with forest-sector professionals, researchers and industry actors, and uses field visits, workshops and lectures to communicate the environmental and economic value of forests. Similarly, LIFE GoProFOR in Italy focused on increasing awareness and knowledge of good forest management practices among institutional managers, forest-sector operators and citizens, including those linked to the Natura 2000 network. These cases illustrate that future PES programmes should not rely only on technical guidance, but should also invest in stakeholders capacity building, for instance by translating ES and PES concepts into audience-specific communication, practical examples, training activities and locally relevant stories.

6. Establish a European Forest PES Gateway and wider support infrastructure

The proposal for a European Forest PES Gateway is strongly supported by the project findings and stakeholder opinions. A multilingual, open and user-friendly platform could enable education and capacity building, reduce duplication, and foster harmonisation by providing model PES setups, contract templates, indicator framework templates, monitoring protocols, guidance material, curated case examples, and communication resources. The Forest PES Gateway should not only support implementation of genuine PES schemes, but also PES-like schemes through existing policy frameworks and strategies (such as CAP, CRCF, Nature Credits Roadmap, etc.).

To be fully effective, the Forest PES Gateway should not function only as a passive repository. It should be linked to wider knowledge support and service infrastructure at the European level and within the Member States, including competence centres, advisory services, knowledge brokers and intermediary organisations that can help translate guidance into implementation at national, regional and local levels and, where relevant, facilitate contact between ecosystem-service buyers and providers.

BOX. PESFOR-W COST Action shows the value of EU-level repositories, guidance and networks for woodland-water PES. This case focused on consolidating learning from existing woodland-water PES schemes and improving Europe's capacity to use PES to support Water Framework Directive objectives. It aimed to create a European repository of PES case studies, develop user guidance, assess governance models, evaluate the environmental and cost-effectiveness of targeted woodland measures, and establish a European network to help improve and extend PES schemes. It shows that such a platform should not be limited to a static database, but should combine curated case study examples with guidance, monitoring and cost-effectiveness information, governance examples, networking functions, and links to advisory services and intermediaries. While PESFOR-W focused on woodland-water PES, the same logic could be expanded to forest carbon, biodiversity, recreation, climate adaptation and bundled forest ecosystem-service schemes.

7. Support context-sensitive bundling of forest ecosystem services

Findings from ProForPES indicate that PES design could recognise co-benefits and trade-offs in forest ecosystem services provision rather than treating services in isolation. This bundling approach may improve ecological additionality, diversify revenues and attract a broader range of buyers, but the project also shows that fully integrated, multi-service schemes can become more complex and costly to operationalise and monitor (see 4). At the same time, the PES literature points to “freeriding” whereby some actors enjoy improved services without contributing financially. Bundling can mask trade-offs between services (e.g. gains in carbon at the expense of water or habitat quality), can create pricing and distributional tensions when a single payment must cover heterogeneous costs and risks, and raise integrity concerns if improvements are counted across overlapping PES, carbon or biodiversity credit schemes.

In an approach to decrease complexity, while still considering ES bundles, future financial programmes could support forest PES schemes that focus on one primary measurable ecosystem service, while explicitly recognising additional FES as co-benefits and where feasible providing incentives for these. A gradual approach will be preferable, in many differing contexts: start with one clearly defined main service, build trust and operational experience, and then expand towards bundled service provision once the scheme is established. This is particularly relevant where schemes connect carbon, biodiversity and water goals, or where territorial and urban initiatives seek to combine climate resilience, recreation, cooling and wider well-being benefits.

BOX. The **Bassenthwaite Vital Uplands** is a pilot in the United Kingdom which provides a strong context-sensitive bundling at catchment scale. The pilot has focused on the Bassenthwaite Lake catchment in Cumbria and has used an ecosystem-services approach to identify land-management actions that can deliver several benefits at once, including water quality, flood regulation, carbon storage, biodiversity, recreation, tourism, timber and landscape values. Rather than creating a separate payment for each service, it explored how multiple benefits could be “packaged” around practical actions such as woodland creation, sustainable grazing and catchment-sensitive management. The case shows that bundling does not require all services to be measured or monetised equally from the start. Instead, PES-type schemes can begin with a primary service, such as water quality or flood regulation, while recognising wider co-benefits and linking them to suitable public, private or mixed funding routes. This makes Bassenthwaite a useful example of gradual, place-based bundling that remains adapted to local ecological and institutional conditions.

8. Target PES within their spatial, ecological-functional contexts, not only administratively

PES is generally more effective where it is directed to areas of high ecological service provision and additionality, such as biodiversity hotspots, water catchments, hazard-prone regions or other functionally connected landscapes subject to credible threats. There is strong evidence in the literature that spatial targeting of land areas to be PES-enrolled is the single-most important factor driving effective PES outcomes.

Future financial programmes should therefore move beyond uniform territorial approaches and use a more nuanced spatial targeting-based logic. This includes ecological, water catchment based, landscape scale and community linked approaches where appropriate, while avoiding the exclusion of ecologically valuable but less visible areas. In policy terms, this implies tailoring funding instruments to the spatial scale and FES at stake, for example CAP for broad uptake, water-related schemes for source catchments, cohesion and territorial instruments for landscape-scale coordination, as well as urban PES schemes for peri-urban and urban forest services.

BOX. The **Green Heart of Cork project** in Portugal provides a strong example of hotspot-based targeting: payments are directed to landowners of sustainable forest management certified cork oak. These are located in areas identified as important for both water retention and biodiversity conservation, using the WebGIS HABEaS tool to identify eligible hotspot areas. Green Heart of Cork also raises questions around self-selection and additionality, as eligibility is linked to FSC certified landowners located in water and biodiversity hotspot areas. While this helps to ensure credible practice standards and spatial targeting, it may also favour landowners who already have the capacity to participate in certification schemes or who are currently managing their forests relatively well. This highlights the importance of complementary strategies to reach less well-known landholders, who may currently lack capacity, and to document incremental ecological gains beyond business-as-usual management. Similarly, the Waidhofen/Ybbs Water Protection Zone in Austria illustrates a water source catchment logic, where forest-management measures are focused on vulnerable drinking-water protection areas in the Ybbs catchment to reduce risks to water quality.

9. Strengthen inclusiveness, governance quality and the role of intermediaries

PES uptake depends heavily on suitable governance approaches, trust and the reduction of transaction costs on both the FES buyer and FES seller sides within multi-level and complex policy settings. Small forest owners, vulnerable groups and local actors can face disproportionate barriers to PES arrangements, while fragmented governance and unclear responsibilities can reduce scheme credibility. The PES literature demonstrates that designated intermediaries, whether NGOs or regionally mandated public bodies, can play a key role in making PES schemes emerge and become effective.

Financial programmes should therefore require proportionate governance safeguards, including clear decision-making rules, grievance or conflict-resolution mechanisms, and attention to fairness and equity in participation and benefit distribution. They should also support intermediary organisations, associations or other partnership approaches that can lower or redistribute transaction costs, through central coordination, assistance with implementation, MRV and contracting, and administrative support for smallholders.

BOX. The BioClima Initiative in Lombardy, Italy provides a useful example of an intermediary supported public-private model. This initiative relies on a €3.5 million regional call for proposals which target bodies

managing protected areas, with the requirement to secure private co-financing amounting to at least 30% of the total project cost. In this case, intermediaries play an important role. A technical facility service has been established, funded by a philanthropic grant-making foundation and entrusted to a private company, to support managing bodies in project design, application preparation, and the mobilisation of private co-financing. The case study also shows the importance of collaboration with farmers and landowners through voluntary agreements, mediated by the intermediaries, to achieve landscape-scale restoration and sustainable land use.

10. Integrate PES into wider land-use, forest and environmental policy frameworks

ProForPES highlights the need to coordinate PES with existing EU policy initiatives such as the EU Forest Strategy, CAP Strategic Plans, CRCF, Climate Adaptation Strategies, Natura 2000 objectives, the Nature Restoration Regulation, water policy, cohesion and territorial funds, municipal planning and other relevant frameworks. This reduces overlap and makes implementation and monitoring more practical.

This means that future EU PES programmes for forest ecosystem services provision should explicitly allow PES-type measures to contribute to, or be in line with, broader policy objectives, and should encourage coordination across policy sectors and administrative levels. PES should support the implementation of suitable forest and land management interventions, rather than creating a parallel policy track disconnected from existing planning and policy processes, thus adopting an integrative approach.

BOX. The **Elmelund Forest / Odense reforestation case** in Denmark provides a useful example of PES-type integration across water policy, afforestation policy and municipal planning. The scheme links groundwater protection with large-scale afforestation, recreation, biodiversity and climate benefits, through cooperation between the local water company, Odense Municipality and the Danish Nature Agency. Another relevant example is LIFE+ Making Good Natura in Italy, which used PES as a governance and self-financing tool for agroforestry areas in Natura 2000 sites. The project illustrates how PES can support existing conservation frameworks by linking ecosystem service valuation, stakeholder engagement, site-management objectives and financing mechanisms for Natura 2000 conservation.

11. Use CAP as main EU-wide entry point for PES and improve its forestry focus

The Common Agricultural Policy (CAP) mainly focuses on agriculture and farming functions, including their environmental compatibility, but still remains the most important existing EU-level route for PES-type support relevant to forestry. ProForPES explicitly identifies CAP-based biodiversity PES as arguably the most scalable and administratively established entry point across Member States. At the same time, weak uptake of forest-related measures have been observed along with limited adoption by Member States, and concerns that existing CAP support is often too action-based and insufficiently tailored to forest ecological timeframes and realities.

CAP-related forest measures should therefore be strengthened through a broader menu of eligible forest ecosystem service measures, larger and more visible budgets, easier access for forest owners and managers, with greater use of hybrid payment models (see 3). In addition, CAP Strategic Plans should allow PES to be used more explicitly as a delivery mechanism for biodiversity actions and outcomes, considering resilience and ecosystem service objectives, including areas outside formally recognised protected areas where more additionality may be realised.

BOX. **LIFE GoProFOR** in Italy provides a useful PES-related example for improving the forest fit of CAP and Rural Development instruments. Rather than operating as a strict PES payment scheme, it shows how forest-sector knowledge can be translated into practical support for future funding measures. The project collected, exchanged and disseminated good forest management practices for biodiversity conservation in Natura 2000 forest habitats, while targeting institutional managers, forest-sector operators and citizens through information and training activities. Its explicit aim to support the use of these practices in future Rural Development planning and forest-planning tools is particularly relevant: it shows that CAP-related forest measures should not only provide payments, but also be supported by sector-specific guidance, good-practice databases, training, advisory support and planning tools. These should help forest owners deliver biodiversity and ecosystem-service outcomes.

12. Develop a dedicated EU forest PES mechanism, building on a wider funding mix

The drawbacks related to CAP-based PES schemes (see 11) constitute a major policy obstacle for the provision of forest ecosystem services at landscape and territorial scales, and to align the PES schemes with forest ecological dynamics. In this vein, ProForPES identified similar weaknesses with other EU financial programmes that facilitate or include PES-like mechanisms for forest ecosystem services (e.g. CRCF, Water Framework Directive, Nature Credits Roadmap).

A dedicated forest ecosystem-services PES mechanism, complementary to CAP, could improve sectoral fit, visibility and administrative coherence, especially if it is explicitly designed around forest-specific timelines, dynamics, actors and monitoring needs. However, the project evidence also suggests that PES should remain integrated with the broader EU funding mix. If developed, such a forest dedicated mechanism should therefore complement, rather than replace, existing entry points: CAP, LIFE, CRCF, cohesion. In addition, climate-related instruments can be pragmatically combined to support the setup and initial implementation of an easy to access PES scheme setup. A next tier should be responsive to forest-specific requirements as sketched above (longer terms, combining results-based with action-based payments, ecosystem service bundles, landscape approach), where possible building on a portfolio of existing financial instruments, but where necessary extended with specific features (including financing through private funding).

BOX. Native Woodland Scheme / Woodland Environmental Fund in Ireland provides a useful national prototype of how a forest-specific PES architecture can build on a wider funding mix. The Native Woodland Scheme supports the creation, restoration and conservation of native woodlands, while the Woodland Environmental Fund provides an access point for businesses to co-finance native woodland establishment. Under the current Irish framework, landowners may receive public forestry grants and, where applicable, PES-type payments for native woodland conservation, while participating businesses can provide an additional contribution to landowners for native woodland planting. The case study is relevant because it combines several elements that a future EU forest PES mechanism could scale up or adapt: a forest-specific policy framework, public support for woodland establishment or conservation, private co-financing, defined ecosystem service benefits such as water quality, aquatic ecosystems, native woodland biodiversity, habitat connectivity, carbon sequestration, soil protection and landscape enhancement, and a facilitation role to connect landowners with business contributors.

7.3. Implications for future EU funding programmes

Taken together, our recommendations suggest that future EU funding programmes should incorporate PES through a coordinated but flexible policy architecture. In practical terms, this means using the seven design themes (see section 4) as a shared structuring PES design framework, strengthening existing entry points for PES use such as forest-based objectives under the CAP and the CRCF, enabling hybrid and blended PES models, embedding PES into wider policy frameworks, investing in the institutional support systems that reduce transaction costs and make wider participation of PES providers and buyers feasible. The suggested Forest PES Gateway should act as the overarching knowledge sharing platform that links to all forest related PES and PES-like financial instruments at the European level, and supports PES implementation through providing capacity building material and supportive material for implementation. Whereas the CAP actually provides an easily accessible and well-known entry point for forest PES in Europe, a dedicated Forest PES mechanism should be developed to facilitate an increased uptake of forest PES schemes throughout Europe.

Several scenarios developed by ProForPES, and presented in section 6, are relevant for specific European policies and financial programmes. Table 10 provides an overview.

Table 10. ProForPES scenarios versus European policies and financial programmes

Scenario	Policy/Financial programme
Scenario 1: Paying for better forest biodiversity through the common agricultural policy (CAP).	Common Agriculture Policy Pillar I

Scenario 2: Protecting water resources through watershed-scale PES.	Water Framework Directive
Scenario 3: Paying for verified forest carbon removals.	Carbon Removals and Carbon Farming Regulation (CRCF)
Scenario 4: Paying for climate resilience and fire risk reduction.	EU Adaptation Strategy
Scenario 5: Paying for urban cooling and well-being through urban and peri-urban forest PES.	Nature Restoration Regulation (Urban Nature Plans), Social Climate Fund
Scenario 6: Integrated landscape PES for bundled ecosystem services.	European Biodiversity Strategy, LEADER
Scenario 7: Securing drinking water at its source through utility-led PES.	Drinking Water Directive

8. Guidelines for implementing the recommendations

To support the practical application of the recommendations formulated above, a stakeholder action matrix is provided. The matrix translates the twelve recommendations into indicative roles and practical tasks for the main stakeholder groups involved in PES and PES-like mechanisms, including forest owners and land managers, policymakers and public authorities, NGOs and intermediaries, researchers and innovation platforms, and private investors or corporate buyers. It is intended as an implementation-oriented guide rather than a fixed allocation of responsibilities, recognising that actor roles may vary depending on the policy context, funding architecture, governance model, spatial scale and type of ecosystem service addressed. The matrix, therefore, complements the recommendations by showing how different actors can contribute to their operationalisation in practice.

Table 9. Stakeholder roles and practical actions matrix for implementing the ProforPES recommendations

Recommendation	Forest Owners / Land Managers	Polymakers / Public Authorities	NGOs / Intermediaries	Researchers / Innovation Platforms	Private Investors / Corporate Buyers
R1. Enable legal and funding stability over ecologically meaningful timeframes	• Implement PES commitments within medium-term forest planning cycles, where relevant. • Keep records on management commitments, costs, risks and ecological constraints over the contract period. • Use renewal or review opportunities to adjust participation where ecological, market or ownership conditions change. • Communicate practical constraints, such as storm, drought, pests or ownership succession, to intermediaries or authorities early.	• Provide stable, predictable legal and funding frameworks for PES over ecologically meaningful periods. • Support medium-term PES contracts, for example 5–10 years where suitable, with renewal or phased-extension options. • Clarify rules for adaptive review, force majeure, transfer of ownership and payment continuity. • Align PES timeframes with forest-management planning cycles and relevant EU/national funding periods.	• Help landowners understand contract duration, renewal conditions, risk clauses and review points. • Translate legal and funding requirements into practical guidance. • Support continuity of participation when ownership, ecological or market conditions change. • Facilitate communication between participants and authorities during periodic reviews.	• Provide evidence on suitable contract lengths for different ecosystem services and forest types. • Analyse how ecological outcomes, participation and payment levels are affected by contract duration. • Develop guidance on adaptive review clauses that remain legally workable. • Evaluate pilots with different renewal and phased-extension models.	• Support longer-term purchase commitments or framework agreements where credible ecosystem-service delivery requires time. • Accept review clauses that address major ecological or policy changes without undermining accountability. • Where relevant, provide bridge or upfront finance linked to agreed milestones. • Avoid short-term funding models that create unrealistic expectations for slow-emerging forest outcomes.

R2. Consider blended finance as a complementary long-term funding architecture	• Develop or participate in co-financing opportunities through EU, national, local or private sources, with support from associations or intermediaries. • Partner with private investors or buyers where upfront costs or long-term commitments need additional finance. • Use cooperatives, associations or other group arrangements to pool small holdings where scale is needed. • Keep transparent records of costs, payments and management commitments required by blended-finance schemes.	• Design legal frameworks enabling public-private PES funds and pooled finance. • Offer tax or fiscal incentives for private co-investors where appropriate. • Provide guarantees, bridge funding or other risk-sharing tools when they reduce entry barriers. • Ensure coherence of PES financing rules with EU State Aid, public procurement and public-funding compatibility requirements.	• Broker agreements between investors and landowners. • Support pooled or revolving finance models where suitable. • Provide capacity-building for landowners and intermediaries on blended-finance design. • Help clarify roles, payment conditions and safeguards to avoid greenwashing.	• Model risk-sharing and return profiles. • Analyse success of blended-finance pilots. • Develop decision-support tools for mixed funding, including public-private, philanthropic and local-revenue models. • Evaluate environmental additionality, financial sustainability and transaction costs.	• Match public funding where private contributions can provide additional ecosystem-service outcomes. • Develop green bonds, ESG funds, sponsorship models or long-term purchase agreements targeting credible PES. • Share risk through guarantee, insurance or bridge-finance schemes where appropriate. • Report financial flows and claims transparently, while respecting data ownership and confidentiality.
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R3. Use more hybrid-payment design in future PES schemes	• Provide accurate baseline data on forest condition and ES. • Negotiate PES contracts that clearly state action requirements, result indicators and payment triggers. • Implement agreed management practices and provide accurate baseline information on forest condition and ecosystem services. • Maintain records needed for verification. • Participate in PES contracts with clearly defined actions, indicators and payment triggers. • Provide feedback on whether action-based, result-based or hybrid payments create a fair risk-reward balance.	• Determine to what extent action-based, result-based or hybrid PES offer the most adequate risk-reward combination. • Provide contract templates and legal guidance. • Offer fiscal incentives for schemes that combine accessibility with ecological credibility. • Monitor compliance across regions. • Facilitate dispute-resolution mechanisms.	• Help define indicators acceptable to all parties. • Provide independent verification and audits where appropriate. • Aggregate small forest properties into groups with similar performance aims, where scale or transaction-cost issues are relevant. • Develop training materials for smallholders on performance metrics and contract management.	• Develop low-cost MRV tools and indicator sets. • Conduct comparative studies of action-based, result-based and hybrid pilots. • Carry out mixed-method impact evaluations of pilot initiatives. • Provide evidence on how different payment designs affect participation, fairness and environmental outcomes.	• Commit to contracts that combine practical implementation support with measurable outcomes. • Select KPIs or indicators based on investment priorities, public safeguards and local feasibility. • Disclose payment triggers and claims clearly. • Provide pre-financing or bridge funds tied to agreed milestones or verified outcomes where appropriate.
R4. Build robust, proportionate MRV systems aligned with existing reporting obligations	• Provide field observations, management records and site-level information needed for verification. • Contribute local ecological knowledge, such as on-site observations and	• Fund regional MRV infrastructure and IT systems. • Harmonise data standards EU-wide. • Ensure privacy and data-security protocols. • Provide subsidies and training for smallholders	• Act as certified third-party verifiers where appropriate. • Train forest owners and land managers in practical monitoring and reporting. • Support data collection, pre-processing and MRV	• Develop remote-sensing-based tools, proxy indicators and AI-assisted analysis. • Co-develop MRV prototypes with local partners before scaling up. • Evaluate	• Finance or co-finance MRV as part of the PES package where needed. • Allow independent auditing of corporate-funded PES claims. • Do not control MRV verification or data

	traditional indicators, where useful. • Use simple reporting tools provided by public authorities or trusted intermediaries. • Avoid being responsible for complex MRV infrastructure unless capacity and support are available.	adopting simple MRV tools. • Retain primary responsibility for public MRV infrastructure and final verification, or mandate trusted intermediaries.	report preparation. • Link field-based data with open data, remote sensing and public-authority systems. • Avoid publishing sensitive site-level data without permission.	cost-effectiveness and uncertainty of MRV methods to support future quantitative impact evaluations. • Put in place MRV frameworks for future quantitative impact evaluations. • Ensure tools complement, rather than replace, locally grounded ecological information.	ownership where this would undermine credibility. • Support transparent summary reporting while respecting confidentiality and sensitive site information.
R5. Improve communication, simplify terminology and invest in awareness raising	• Participate in awareness-raising and information sessions offered by forest owner associations, NGOs or extension services. • Share practical questions, concerns and examples that can make PES guidance clearer. • Communicate locally relevant ecosystem-service benefits, such as water, biodiversity, recreation or climate resilience. • Help identify terminology that is confusing for landowners and managers.	• Fund long-term communication tailored to landowners, authorities, businesses and the public. • Use clear and consistent terminology in calls, guidance and contracts. • Explain how specific schemes relate to PES, PES-like mechanisms, nature credits or agri-environmental support. • Provide practical guidance in accessible language and multiple languages if relevant.	• Translate technical PES concepts into practical guidance and local examples. • Organise workshops, field days and dialogue formats to build trust and understanding. • Facilitate communication between buyers, providers and public authorities. • Develop communication materials that explain payments, obligations, claims and safeguards.	• Test which terminology and communication formats improve understanding and participation. • Produce open-access explainers, curricula and case-study material. • Evaluate awareness-raising and communication outcomes. • Provide evidence on misconceptions, barriers and effective narratives around PES.	• Communicate corporate PES contributions clearly and avoid overclaiming or greenwashing. • Train corporate staff on forest ecosystem functions, PES principles and credible environmental claims. • Support communication activities that explain private contributions without replacing public accountability. • Use consistent language in sustainability reporting.

R6. Establish a European PES platform and wider support infrastructure	• Use the European PES platform to access model contracts, guidance, case studies and training materials. • Share anonymised case data, lessons learned and implementation challenges from local PES projects where appropriate. • Provide feedback on what guidance, templates or tools are missing. • Connect with peer-learning networks, advisory services or competence centres.	• Finance and host an EU-wide knowledge hub. • Ensure open-data policies, regular updates and an annual open call for new cases where feasible. • Link the platform to existing EU data systems, advisory services and competence centres. • Provide standard templates, indicator guidance, MRV protocols and funding-navigation tools.	• Curate case studies and upload best practices. • Maintain user-friendly guidance for practitioners, together with researchers and public authorities. • Act as knowledge brokers between the platform and local implementation. • Help users navigate model contracts, funding routes, indicator sets and MRV templates.	• Populate the platform with scientific data, synthesis reports and evaluated case studies. • Provide and contribute to training materials. • Develop comparable indicator sets, monitoring protocols and evaluation methods. • Maintain quality control for evidence-based guidance and case documentation.	• Contribute corporate case studies, investment models and lessons learned where appropriate. • Share best practices for credible corporate participation in PES. • Use platform guidance to align investment claims with recognised safeguards. • Do not upload monitoring results unless data ownership and consent arrangements allow it.
R7. Support context-sensitive bundling of ecosystem services	• Identify priority ecosystem services (e.g. carbon, biodiversity, water or recreation) relevant to local management objectives. • Identify a primary service suitable for payment and document relevant co-benefits. • Participate in bundled or multi-service contracts where transaction costs and MRV requirements remain manageable. • Form owner cooperatives or	Support pilot projects testing bundled ecosystem-service contracts. Develop clear legal guidance to avoid double claiming or double payment for the same verified service unit, while allowing co-benefits to be recognised or rewarded. Ensure accounting methods are coherent across carbon, biodiversity, water and other policy	• Develop buyer networks for bundled services. • Create valuation tools for combined ecosystem-service benefits. • Promote multi-service pilot projects. • Support community understanding of multi-service valuation. • Help match landowner service priorities with buyer demand.	• Provide assessments and indicators. • Research demand for different types of ecosystem-service bundles. • Produce valuation and trade-off analyses. • Publish guidelines on multi-service contracting. • Analyse when bundling is ecologically useful and when it creates excessive transaction costs.	Act as multi-service buyers where credible, for example carbon + water + biodiversity. Invest in bundled ecosystem-service models only where indicators, claims and benefit-sharing rules are clear. Provide long-term purchase agreements that reward diversified services and recognised co-benefits.

	associations to supply services at scale where useful.	frameworks.			
R8. Target PES within their spatial-functional contexts, not only administratively	• Provide local knowledge on forest condition, management history, access constraints and ecosystem-service potential. • Participate in targeted PES where land has high additionality or functional importance, such as source catchments, biodiversity corridors or hazard-prone areas. • Ensure targeting does not unfairly exclude smaller or less visible forest owners.	• Prioritise areas where PES can generate the greatest additional ecosystem-service benefits. • Use ecological, catchment-based, landscape-scale and community-linked targeting criteria rather than only administrative boundaries. • Ensure targeting rules are transparent and fair.	• Facilitate local engagement in priority areas and help aggregate participants where scale is needed. • Support smallholders in targeted zones to meet eligibility and documentation requirements. • Communicate why specific areas are prioritised and how others may participate in future phases.	• Develop spatial-priority maps, additionality assessments and landscape/catchment models. • Identify areas where PES can deliver the greatest incremental ecosystem-service benefits. • Provide transparent methods that can be adapted by Member States and regions.	• Direct funding toward areas where additional ecosystem-service outcomes are credible and verifiable. • Use spatial targeting information to select projects without bypassing public safeguards or local rights.
R9. Strengthen inclusiveness, governance quality and the role of intermediaries	• Participate, where appropriate, through forest-owner associations in local or regional PES consultations. • Ensure smallholders and women owners are included where possible. • Provide feedback on implementation challenges. Collaborate with neighbouring owners or associations where this strengthens participation	• Establish transparent decision-making, grievance and conflict-resolution processes. • Fund inclusive consultation processes and monitor equity outcomes. • Support intermediaries, associations or aggregators that lower transaction costs. • Encourage local involvement without making local co-design or consent an unrealistic requirement in all schemes.	• Facilitate multi-actor dialogues and trust-building. • Provide mediation services in disputes. • Ensure marginalised groups are represented where relevant. • Act as neutral brokers, aggregators or fund managers when appropriate. • Support accessible mechanisms for dispute resolution and	• Analyse governance structures and power dynamics. • Recommend equitable benefit-sharing models. • Track social impacts of PES participation. • Document and evaluate partnership and intermediary models. • Disseminate lessons on governance quality, transaction costs and inclusiveness.	• Participate in governance arrangements where appropriate as accountable partners. • Respect public safeguards and benefit-sharing rules. • Support fair participation without requiring equal voting rights in every operational decision. • Provide long-term capital where governance and accountability conditions are clear.

	and bargaining capacity.	• Provide standard governance safeguards and accountability rules.	accountability. • Document and share best practices.		• Avoid excessive disclosure requirements that discourage buyers or providers, while maintaining transparency on claims.
R10. Integrate PES into wider land-use, forest and environmental policy frameworks	• Where relevant, align PES participation with forest management plans, Natura 2000 objectives, certification requirements and other land-use obligations. • Include ES delivery targets rather than only PES targets in management planning where appropriate. • Seek technical advice to ensure PES obligations do not conflict with other land-use rights or obligations. • Coordinate with neighbouring owners where landscape-level implementation is needed.	• Integrate PES into regional climate, biodiversity, water and forest strategies. • Allow PES to support or facilitate suitable forest and land-management interventions, rather than creating a parallel policy track. • Align PES with disaster risk-reduction, climate adaptation and nature-restoration objectives where relevant. • Coordinate across ministries and administrative levels to reduce overlap.	• Provide technical support to landowners, public authorities and buyers. • Help align PES contracts with existing policy, planning and certification requirements. • Facilitate coordination between authorities, landowners and investors. • Identify where PES can reduce implementation barriers for suitable land-management interventions.	• Provide full spatial models, calculation sheets and decision-support tools for ES modelling. • Assess trade-offs between timber, recreation, biodiversity, water and PES-supported interventions. • Analyse policy coherence across CAP, forest, water, climate and biodiversity frameworks. • Develop guidance on integrating PES without creating administrative duplication.	• Respect local zoning, certification requirements and policy safeguards when investing in PES. • Coordinate with forest managers or intermediaries rather than independently defining land-use priorities. • Align corporate PES investments with recognised regional or national objectives where appropriate. • Avoid investments that conflict with existing land-use rights, conservation objectives or public plans.
R11. Use CAP as the main EU-wide entry point for PES, but improve its forest fit	• Use available CAP-related forest and biodiversity measures where they fit forest ownership and management objectives. • Provide practical feedback on administrative	• Adapt CAP Strategic Plans to better accommodate PES for forest ecosystem services. • Simplify procedures and tailor eligibility, payment duration and monitoring to forest ecological timeframes.	• Help forest owners identify relevant CAP entry points and prepare applications. • Support smallholders and associations in navigating administrative requirements.	• Assess which CAP forest measures are most suitable for PES-type delivery. • Evaluate uptake barriers, payment adequacy and forest-sector fit across Member States.	• Respect CAP, State Aid and double-funding rules when co-financing PES activities. • Engage through transparent agreements with authorities, intermediaries and

	barriers, eligibility rules, payment levels and forest-specific constraints.	• Combine action-based support with result-based incentives where monitoring capacity allows.	• Provide advisory services on eligibility, co-financing, MRV and documentation.		forest-owner groups.
R12. Establish a dedicated EU forest ecosystem services mechanism linked to the wider funding mix	• Participate in consultations or pilots for a forest ecosystem-services mechanism. • Use simplified forest-specific templates where available.	• Develop and assess a dedicated EU forest ecosystem-services mechanism that complements CAP, LIFE, cohesion and climate-related instruments. • Design forest-specific eligibility, timeframes, payment logic and MRV requirements. • Provide clear rules on additionality, double funding, State Aid and administrative simplification.	• Help design and test easy-to-join models for forest owners and local actors. • Provide advisory support for applications, contracting, aggregation and MRV. • Ensure lessons from pilots are fed back into EU-level design.	• Provide evidence on gaps in current EU funding for forest ecosystem services. • Develop forest-specific indicator sets, payment models and MRV guidance. • Evaluate pilot mechanisms for environmental effectiveness, participation and administrative burden.	• Use the dedicated mechanism as a transparent entry point for complementary private contributions. • Match public funding where additional private finance can support verified forest ecosystem-service outcomes.

9. Conclusion

Based on literature review, an analysis of case studies and consultations of experts and stakeholders, the ProForPES project has drafted 7 scenarios for Forest PES schemes in Europe and X recommendations for improving the efficiency and effectiveness for Forest PES schemes. These recommendations are:

1. Enable legal and funding stability over ecologically meaningful timeframes
2. Consider blended finance as a complementary funding model
3. Use more hybrid-payment (action- and result-based) design in future PES schemes
4. Build robust, proportionate MRV systems aligned with existing reporting obligations
5. Improve communication, simplify terminology and invest in awareness raising
6. Establish a European Forest PES Gateway and wider support infrastructure
7. Support context-sensitive bundling of forest ecosystem services
8. Target PES within their spatial, ecological-functional contexts, not only administratively
9. Strengthen inclusiveness, governance quality and the role of intermediaries
10. Integrate PES into wider land-use, forest and environmental policy frameworks
11. Use CAP as main EU-wide entry point for PES and improve its forestry focus
12. Develop a dedicated EU forest PES mechanism, building on a wider funding mix

Finally, an action matrix for implementing these recommendations concludes the work.

Overall, the need for more forest PES schemes is highlighted, as these schemes allow combining private and public funding from European, national and regional levels. Such funding portfolios support context-dependency and focussed interventions for sustainable forestry, which in several scenarios is combined with water quality and quantity protection, carbon sequestration, human health and wellbeing, wildfire risk reduction, and improved ecological and environmental conditions in general. The temporal frameworks range from 5 to 20 years, with shorter frameworks overall being more accessible to forest and land managers, and being more flexible. Longer timeframes are more effective to guarantee positive ecological outcomes, and to measure these. The project outcomes support the call for hybrid funding schemes, based on action-based payments (that support forest managers for the upfront costs for investment and management measures) combined with result-based payments linked to observed impacts. Forest PES schemes can have diverging geographical scopes, in line with the focus of the scheme (for example catchment-wide for water focussed PES schemes), but other land uses than forestry could also be considered in the setup of such schemes, due to their impact on the outcomes. Finally, it is clear that for a forest PES scheme to be efficient, credibility, legitimacy, trust and transparency are utmost important, while reduced complexity, bureaucracy and transaction costs are facilitating participation of land and forest managers. Awareness raising of all actors (including the general public and decision-makers) is instrumental for generating a willingness to contribute financially, or to participate in the forest PES scheme.

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Glossary

Term	Short description (close to source wording / standard usage)	Link
CAP (Common Agricultural Policy)	The CAP is the EU policy framework for agriculture and rural areas; in 2023–2027, Member States implement it through CAP Strategic Plans with flexibility to adapt measures to national/local needs.	https://agriculture.ec.europa.eu/cap-my-country_en
CAP Strategic Plans / interventions	CAP Strategic Plans set out the intervention strategy and instruments each Member State uses to achieve CAP objectives in 2023–2027.	https://agriculture.ec.europa.eu/cap-my-country/cap-strategic-plans_en
Natura 2000	An EU-wide network of protected areas aimed at ensuring the long-term survival of Europe's most valuable and threatened species and habitat types.	https://environment.ec.europa.eu/topics/nature-and-biodiversity/natura-2000_en
CICES (Common International Classification of Ecosystem Services)	A classification framework used to identify and compare ecosystem services (including Regulation & Maintenance services such as habitat/gene pool protection, hydrological regulation, and climate regulation).	https://cices.eu/
MRV (Monitoring, Reporting, Verification)	A system for monitoring activities/results, reporting data, and verifying compliance or claims; used in PES/carbon schemes to support conditionality and credibility. (<i>General standard usage; CRCF uses monitoring/reporting/certification/verification language.</i>)	CRCF overview: https://climate.ec.europa.eu/eu-action/carbon-removals-and-carbon-farming_en
Copernicus / Earth Observation (EO)	Copernicus is the Earth observation component of the EU Space Programme, providing environmental monitoring data and services.	https://www.copernicus.eu/en
Action-based payment	Payment linked to implementation/maintenance of agreed management actions or conditions (e.g., buffers, fuel breaks, habitat trees), rather than only final outcomes. (<i>PES design term.</i>)	
Results-based payment	Payment linked to measured/verified outcomes or indicators (e.g., verified removals, ecological indicators), subject to monitoring feasibility and attribution. (<i>PES design term.</i>)	
CRCF (Carbon Removals and Carbon Farming Certification Framework)	The CRCF Regulation established the first EU-wide voluntary certification framework for permanent carbon removals, carbon farming, and carbon storage in products.	https://climate.ec.europa.eu/eu-action/carbon-removals-and-carbon-farming_en
Risk buffer / pooled reserve (carbon)	A safeguard mechanism (buffer reserve / risk-pooling) used to manage reversal/non-permanence risk in carbon projects and protect scheme credibility.	

River basin / catchment / sub-basin	Hydrological units used for water management: a basin/catchment drains to a river system; a sub-basin is a smaller hydrological unit within it.	WFD overview: https://environment.ec.europa.eu/topics/water/water-framework-directive_en
WFD (Water Framework Directive)	EU water policy framework based on River Basin Management Plans (RBMPs) and Programmes of Measures (PoMs) to protect/restore water bodies, reach good status, and prevent deterioration.	https://environment.ec.europa.eu/topics/water/water-framework-directive_en
RBMP (River Basin Management Plan)	The river-basin planning instrument under the WFD, used with Programmes of Measures to organise water protection/restoration actions.	https://environment.ec.europa.eu/topics/water/water-framework-directive_en
DWD (recast Drinking Water Directive)	The recast EU Drinking Water Directive includes updated standards and a preventive, risk-based approach that favours action to reduce pollution at source.	https://environment.ec.europa.eu/topics/water/drinking-water_en
Source water / source-catchment protection	Protection of catchment areas upstream of abstraction points to reduce raw-water pollution risks and support safe drinking-water supply.	
Riparian buffer	Vegetated buffer strips along watercourses used to reduce erosion/sediment/nutrient transfer and support bank stability and water protection. (<i>Standard land/water management term.</i>)	
WUI (Wildland–Urban Interface)	Areas where settlements and flammable vegetation meet/intermix; often a priority zone for wildfire prevention and risk reduction.	
Fuel break	A managed strip/zone where vegetation fuels are reduced to slow fire spread and support wildfire suppression/prevention strategy. (<i>Standard wildfire management term.</i>)	

